

CAREER ALERT:

GLOOMY OUTLOOK

The good life of IT workers is about to crash for those who can't adapt to a new reality. Page 57



SEEKING SECURITY

Good security chiefs are so rare that it takes companies extra time to find the right person. Page 62



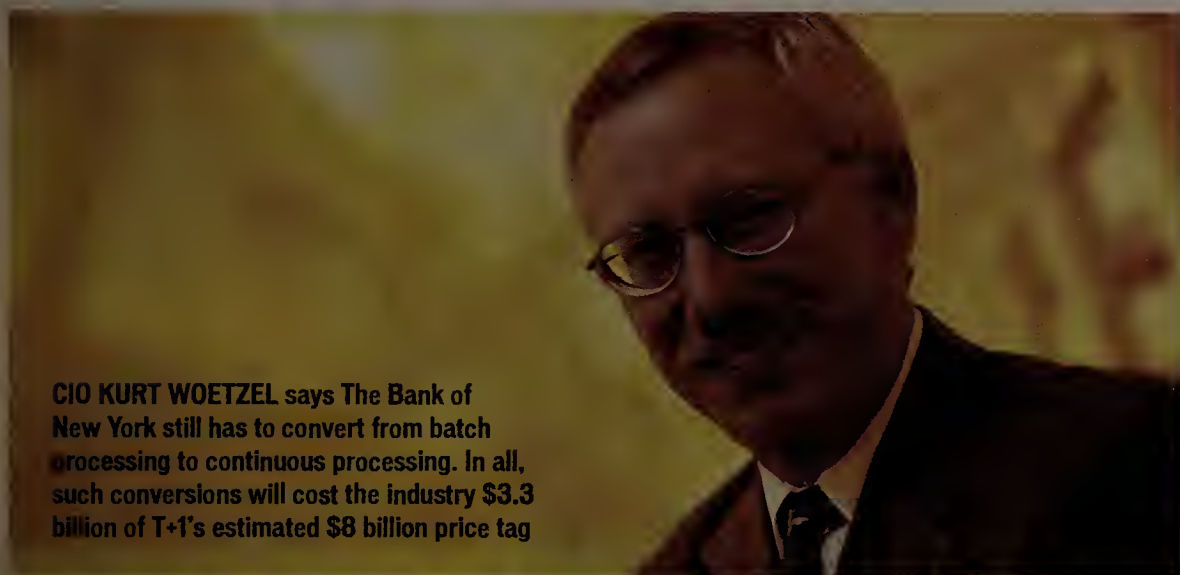
HOMEGROWN TALENT

Smart companies breed their own talent by training nontechnies for hard-to-fill IT jobs. Page 106

COMPUTERWORLD

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SEPTEMBER 25, 2000 • VOL. 34 • NO. 39 • \$5 COPY



JOHN RAE

CIO KURT WOETZEL says The Bank of New York still has to convert from batch processing to continuous processing. In all, such conversions will cost the industry \$3.3 billion of T+1's estimated \$8 billion price tag

BIGGER THAN Y2K

THE SECURITIES INDUSTRY HAS BEEN BUFFETED BY A CONSTANT SERIES OF challenging IT projects: preparing its systems for the euro, Y2k, online trading, decimal stock prices — and now T+1. T+1 means trades have to be settled in one day instead of three, and that means the end of batch processing, reports Maria Trombly. The cost? Try **\$8 billion, several billion more than the industry spent on Y2k.**

Story is on page 20.

**WALL STREET
WATCH**

MICROSOFT MAKES BID FOR ENTERPRISE

Launch of high-end operating system and .Net enterprise servers takes aim at Unix

BY CAROL SLIWA

Microsoft Corp. tomorrow will stage its Enterprise 2000 Launch, laying the final colossal bricks for the Windows 2000 foundation that it has been building to challenge high-end Unix systems.

But no matter how many impressive hardware partners, customers and benchmark performance numbers the company trots out in San Francisco, it will face a tough challenge winning over corporate users who have grown increasingly skeptical of Microsoft's reliability and scalability claims, several analysts said.

Microsoft may have a greatly improved operating system in Windows 2000 Datacenter Server and a well-integrated family of enterprise servers and tools on which to build its .Net strategy. But analysts predicted that users won't rush to rip out their Unix boxes.

"You've got to have a compelling reason [to switch]. I could think all day and all night, and I'm not sure I could come up with a good functional reason," said Randy Richard-Microsoft, page 129

FORD, IN CRISIS, TURNS TO IT TEAM

But analysts question lack of timely tire data

BY BOB BREWIN
AND DAN VERTON

Faced with mounting consumer complaints and intense media coverage of a series of accidents and deaths caused by rollovers of its Explorer sport utility vehicles, Ford Motor Co. established a high-tech "war room" at its headquarters

Ford, page 129

OLDER SYSTEMS HINDER E-PAYMENTS

Costly methods under review by lawmakers

BY PATRICK THIBODEAU
WASHINGTON

For Supervalu Inc., a food dis-

tributor and operator of some 500 retail stores, developing alternative electronic-payment systems has become a bottom-line issue.

If its customers use credit or debit cards to make purchases,

Supervalu often must pay a transaction fee that can wipe out a "razor-thin" margin on a small sale, said Jacki Snyder, manager of electronic payments at the Eden Prairie, Minn.-based company. "In some cases, the fees on one grocery order exceed \$1, more than the supermarket profit on the same order," she said.

The example highlights one of the problems involved with electronic payments that were outlined last week by Snyder and other financial service experts before the U.S. House Subcommittee on Domestic and International Monetary

Payment, page 16

INSURER ROLLS OUT WIRELESS ACCESS

Struggled with language but kept project in-house

BY BOB BREWIN

After a crash development project, The Progressive Corp. last week announced that it's starting to offer wireless Web access to holders of its auto insurance policies.

Progressive, the fourth-largest automobile insurer in the U.S., with more than 8 million

Wireless, page 16

Making Claims

Notable aspects of Progressive's wireless application:

- Developed **in-house** using Wireless Markup Language
- Can be **accessed through any type** of wireless Web-enabled phone
- Works on **any cellular network** in the country
- Provides customers with **fast access** to claims reps and account information
- **Wireless payment module** planned within a matter of weeks

To A Network Administrator, This Is What The Holy Grail Looks Like.



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CLEAR COMPUTING

Apple Computer has a "clear" vision of the way computer hardware should look and operate and isn't afraid to break out of existing molds.

Reviewer Tom Thompson looks at the new Power Mac G4 Cube, likes what he sees — and doesn't see — then puts a demanding workload through it. Page 92



OH, THE HUMANITY!

When developing disaster recovery plans, businesses need to remember their most important resource: employees. If they and their families aren't taken care of, there won't be anyone around to run the business when disaster does strike, warn consultants. Page 48

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NEWS

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- 6 BOEING LAUNCHES** a marketplace with Lockheed Martin and others, hoping to cut purchasing costs by 27%.
- 8 Ariba Debuts** a slew of e-market features, packaging auctions and integration.
- 10 UPS STEPS** into the e-commerce fray with a service to help return online purchases.
- 12 USERS UNITE** to promote standard security expectations for online relationships.
- 14 OPTICAL FIBER SAVES** money compared with copper, a new study claims.
- 16 WIRELESS LANS** mature, as host of products ship ready-made with radio network connections.
- 24 YAHOO SIGNS** Barnes & Noble as its default bookseller, which also promises free Net access from its brick stores.
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OPINIONS

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- 90 JUDE THADDEUS SAYS** he hopes smart cards will solve password-security woes, but the project gets bogged down almost as soon as it starts.
- 94 DATA VISUALIZATION** software is emerging as a serious business-analysis tool for corporate IT, allowing users to quickly spot trends in multi-dimensional data.
- 96 POWERFUL TOOLS** can simplify the job of setting up new PCs or migrating to a different operating system.
- QUICKSTUDY**
- 102 SYMMETRICAL** multiprocessing, with two or more CPUs in a box, can boost your computing power — provided you have the right software.

ONLINE

As IT professionals interact with more people inside and outside corporations, recruiting for behavior can become as important as — and in some cases even more important than — technical savvy. Gartner Group's Barbara Gomolski offers hiring advice on our **Workforce Watch** page. www.computerworld.com/workforce

On *Computerworld.com*, we unveil our latest research section, **IT Reports**, offering access to white papers and analysts' reports on everything from business processes to wireless applications. <http://itreports.computerworld.com>

In our **E-Commerce Community**, reader Joe Reinhardt laments the loss of privacy in the cyberspace. www.computerworld.com/ecommerce

Do you work with someone you think is truly an IT leader? You can nominate your colleague for next year's Premier 100 awards. www.computerworld.com/nominatep100

COMPUTERWORLD
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PREMIER
IT LEADERS

believes the laptop's days are numbered.

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wireless technology in the workplace.

- 56 JIM CHAMPY** tells brick-and-mortars that are considering forming new firms for the Web: Don't neglect what got you where you are today.
- 130 FRANK HAYES** offers a list of IT things that remain true, despite what vendor representatives, industry analysts and pundits say.

AT DEADLINE

AT&T Labs to Close San Jose Facility

AT&T Labs will close its San Jose facility and lay off the approximately 40 employees there, the company said last week. Spokesman Mike Dickman said the operation involves a single development team, whose members have the option to transfer. The company decided to close the site because it isn't focused on an area of current interest, he said.

Veterans Records Found Vulnerable

The information systems controls at the U.S. Department of Veterans Affairs were faulted by the agency's own inspector general, who told the House Committee on Veterans Affairs last week that testing on benefits records found them vulnerable to unauthorized access. Among the problems was a lack of strong passwords by end users. The VA is upgrading its systems and plans to spend about \$1.4 billion on information technology initiatives.

Protocol Aims to Buoy Wireless Content

Sun Microsystems Inc., in conjunction with several partners, last week announced a new Java-based protocol to bolster content on wireless devices. Sun said its Mobile Information Device (MID) profile will enhance personal access to content such as local weather and stock quotes on wireless devices with enhanced features. The open-source, standards-based protocol will work for any device programmed with the MID profile. Some 20 companies helped create the profile.

New ASP Taps Giants

Technologies and services from Microsoft Corp., IBM, Arthur Andersen LLP in Chicago and Avaya Inc. in Basking Ridge, N.J., will power Enfrastructure Inc., a newly created application and infrastructure provider with more than \$100 million in funding. Aliso Viejo, Calif.-based Enfrastructure will provide software, hardware, network hosting and human resources services from 25 campuses worldwide.

Bank One's Wingspan Fails to Take Off Online

Internet-only bank the latest to seek real-world anchor in parent company

BY MARIA TROMBLAY

BANK ONE Corp.'s WingspanBank.com, a stand-alone, Internet-only bank, will be downgraded to a test lab because it didn't attract enough customers, bank officials said last week.

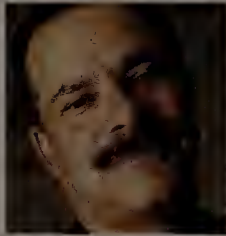
Wingspan joins a host of other banks launched exclusively online that have had to move closer to their real-world sponsors or partner with other entities to survive. Most recently, Citibank closed down its online-only bank.

"Pure Internet plays are having a hard time getting off the ground," said Bank One Executive Vice President Bruce Luecke. "It's harder

to make deposits. It's harder to make withdrawals." He declined to detail the online bank's fortunes other than to say, "It's weak right now."

When Wingspan was first launched in June of last year, bank officials said they would spend between \$100 million and \$150 million on the venture. Chicago-based Bank One hasn't made any further statements about its investment, and officials refused to comment on how much it would cost to fold Wingspan back into Bank One's online offerings. They did

say, however, that Wingspan had 95,000 customers at the end of this past June — compared with 8 million customers



LUECKE: Wingspan is "weak right now"

at Bank One, more than 600,000 of whom used Bank One's online services.

Bank One will use Wingspan as a test lab for online banking products, such as a pilot program in which Wingspan customers can open their accounts at Bank One branches. Currently, Wingspan customers have to mail in deposits or use electronic transfers.

High Expectations

Other Internet-only banks have also learned their lessons. New York-based Citibank recently decided to close its online-only bank, Citi f/i, and merge it with Citibank.com, the online version of its physical bank.

And last spring, Palo Alto, Calif.-based ETrade Group Inc. bought the nation's largest independent network of centrally managed automated teller machines, Portland, Ore.-based Card Capture Services Inc., which had a total of 8,500

machines. The purchase came shortly after ETrade purchased Telebank, a leading online-only bank.

Some Internet banks have decided to partner with offline firms. VirtualBank, a wholly owned subsidiary of 1stVirtual Inc. in Palm Beach Gardens, Fla., struck deals with three companies and will put physical branches in or near the companies' headquarters to provide banking services to their employees. Internet-only banks are targeting other niche groups as well.

But Wingspan's failure to take off may just mean its founders expected too much, said George Barto, an analyst at Gartner Group Inc. in Stamford, Conn. For example, Barto said, NetBank Inc. in Alpharetta, Ga., has reached \$1.5 billion in assets in more than 110,000 accounts — and boasts nine consecutive profitable quarters.

NetBank picked a niche — people who wanted an Internet-only bank — and stuck to its plans, he said, which made the bank successful. "The failure of Wingspan was [the result of] the expectations of its parent company," he said. "They wanted a million accounts, and that wasn't realistic." ▀

Navy to Award \$12B-Plus Intranet Contract

BY DAN VERTON

After nine months and a half-dozen congressional hearings, the U.S. Navy this week will award one of the most contentious and complex outsourcing deals in history.

Navy officials last week told *Computerworld* that the service will award the long-awaited Navy/Marine Corps Intranet (N/MCI) contract early this week. The eight-year contract, valued at between \$12 billion and \$16 billion, has been labeled by some as the largest outsourcing deal in the world, and one that represents a sea change in the role of private industry in government.

Naval sources have repeatedly identified Computer Sciences Corp. in El Segundo, Calif., as the top contender for the contract. However, other industry notables vying for the deal are Electronic Data Systems Corp. in Plano, Texas, General Dynamics Corp. in

Falls Church, Va., and IBM.

N/MCI is designed to replace dozens of Navy and Marine Corps networks with a centrally managed, contractor-run intranet. Naval officials claim that N/MCI is necessary for the service to make use of new technologies and fight the battles of the future more effectively.

Formidable Challenge

Officials also said the intranet will enhance security by cutting down on the number of disparate networks, security flaws and back doors. Work on N/MCI will begin Oct. 1.

N/MCI is a complex "seat management" pact that will require the Navy to transfer tacit ownership of its information technology assets to a commercial contractor. The Navy will then purchase IT services as a utility, similar to the purchase of phone services.

The Navy would have need-

ed \$3 billion per year to upgrade all its IT assets on its own, according to Ron Turner, the Navy's deputy CIO for infrastructure, systems and technology.

But the budget couldn't support that, so the Navy asked industry to share in the investment and agree to spread the costs. In addition, the winning vendor will give the Navy credit for all existing infrastructure that can be used as part of N/MCI.

The Navy also plans to offer the contractor dollar incen-

tives for network uptime, enhanced security and performance. Likewise, there will be penalties for poor performance and security lapses, Turner said.

However, some industry analysts said they're skeptical about N/MCI's future.

Chip Mather, a senior vice president at Acquisition Solutions Inc., a federal procurement consulting company in Chantilly, Va., said the two biggest challenges N/MCI faces are actual deployment and achieving the advertised savings and efficiencies.

"To date, seat management has, at best, been a mixed bag in the government," said Mather. ▀

Navy/Marine Corps Intranet

Contract: Five years (three-year option) for as much as \$16B

Users: As many as 350,000 Navy and Marine users aboard ships and at hundreds of bases around the world

Service-level agreements: There are 44 such agreements that the vendor must meet or it will risk financial penalties and even contract termination.



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Aerospace/Defense Exchange Could Take Flight This Month

Exostar could affect buying patterns throughout the industry

BY MARC L. SONGINI

A NEW ONLINE exchange founded by aerospace industry powerhouses The Boeing Co., Raytheon Co., Lockheed Martin Corp. and BAE Systems is due to go live this quarter, possibly as soon as month's end.

Because of the purchasing power and prominence of Boeing in the aerospace industry, this exchange could have a ripple effect, squeezing out cost and affecting buying patterns throughout the entire industry, said Joshua Greenbaum, an analyst at Enterprise Applications Consulting in Berkeley, Calif.

No doubt, that's what Exostar's partners want, he said.

"It will have a major effect in how we do business and in the market's supply chain," said a spokesman at Bethesda, Md.-based Lockheed Martin.

Seattle-based Boeing and Pleasanton, Calif.-based software vendor Commerce One Inc. last week announced that they have successfully completed a test drive for linking Boeing's trading partners to Washington-based Exostar Inc. aerospace and defense business-to-business exchange.

Aiding Smaller Suppliers

The exchange could prove advantageous to smaller suppliers that will now have one way of linking to many different customers — instead of having a different set of applications for each buyer, he said.

Lockheed Martin is in ongoing discussions with the U.S. Department of Defense to see if the government will sign on as a buyer. The Exostar partners shared details of the exchange at Commerce One's user conference in Las Vegas.

Exostar — first announced in March by Boeing, Lockheed Martin, Lexington, Mass.-based Raytheon and U.K.-based BAE Systems — will let suppliers using electronic data interchange (EDI) technology connect to

buyers via a service from Gaithersburg, Md.-based GE Global eXchange Services that translates EDI transmissions into an XML format.

The exchange is expected to offer a variety of services, including auctioning, purchase forecasting and the ability to issue electronic payments and receipts.

Such an exchange is particularly significant in an industry like aerospace/defense, where half of the final product initially arrives at the Boeing or Lockheed Martin factory as dozens of separate components awaiting assembly, according to spokesmen from both companies.

Boeing alone buys \$37 billion worth of goods each year and is now looking to reduce the administrative costs of its purchasing operations by as much as 27%; Lockheed buys \$13 billion in supplies and hopes to see a 10% reduction in costs.

High Hopes

While there are no specific suppliers signed on yet, Boeing said it has high hopes for Exostar. A spokesman said the company eventually plans to tie its enterprise resource planning system and other back-office applications to the exchange in an attempt to realize even greater supply-chain efficiencies.

On the Horizon

The aerospace/defense industry is in line to get a new exchange, called Exostar, which could revamp its supply-chain infrastructure.

Exostar's major partners include **Boeing, Lockheed Martin, Raytheon and BAE Systems**, which have a combined \$71 billion in procurement spending and 37,000 suppliers. Exostar will use software and services from Commerce One and GE Global eXchange Services. The industry represents a total of **\$400 billion** in annual procurement spending.

The exchange could also help give Boeing the edge against global competitors such as the massive Airbus Industrie in France, analysts said.

Boeing already operates several private exchanges, but Exostar is expected to be the largest, most accessible electronic marketplace in the defense/aerospace industry.

Interestingly, the industry has been rather slow to move to such a comprehensive exchange, said Craig Schmitman, editor of AeroSpaceNews.com, an online news service in Ojai, Calif.

Boeing takes slow but firm steps when deciding which technological direction to take, and then moves aggressively to implement what it has chosen, Schmitman said, "[but] clearly, they're a believer in business-to-business e-commerce."

MORE THIS ISSUE

For more about business-to-business e-commerce, see page 8.

Dell Marketplace to Enable Custom Pitches

Exchange will give largest corporate accounts access to millions of users

BY JULIA KING

Dell Computer Corp. next month plans to launch an electronic business-to-business marketplace that will let its largest corporate customers hone in on Dell's millions of users, employing customized sales pitches.

For example, an electronics supplier selling projectors on the exchange might list product benefits such as "lightweight" and "high image quality" for a less-sophisticated buyer but display all of the technical specifications for a buyer who identifies himself as an engineer.

"We've built in technology at the marketplace to identify the customer and pass that on to the supplier," which can then give that customer a personal-

ized buying experience, said John Hampton, director of new ventures at the Round Rock, Texas-based computer company.

The ability to laser-focus on specific sets of customers is one of the Dell exchange's key advantages, suppliers said. Most other marketplaces, in contrast, allow only for posting static product catalogs, which all customers, regardless of their size or industry, see the same way.

This "virtual showroom" capability is provided via Austin, Texas-

based Exterprise Inc.'s ActiveMarket software, which is embedded in the Dell exchange. 3M Co.'s Office Ergonomics products will be the first to use this capability.



"WE CAN'T GET more targeted with our ergonomic products," says 3M's Mullaney

"We can't get any more targeted with our ergonomic products," said Paul Mullaney, 3M's office supplies division e-business manager. 3M is one of three companies, along with Pitney Bowes Inc. and Motorola Inc., involved in a pilot test of the marketplace, which is due to go live at the end of next month.

"This is a tremendous opportunity for us to market to known computer users," Mullaney said.

The Dell exchange differs from countless other business-to-business exchanges for office supplies in that suppliers and buyers can execute online transactions according to predefined trading rules.

On the buy side, the new Internet exchange, www.dellmarketplace.com, is tailored to small and medium-size companies, which large companies typically reach through more expensive means, such as direct salespeople, or not at all.

"The Dell Marketplace is like a mall. Dell is the mall owner, and we're allowing our customers to open up stores behind us," said Hampton.

Initially, Dell will charge transaction fees for each order executed on the exchange, but these fees will be phased out as the exchange offers more value-added services for which it can collect other fees, said Hampton.

Looking forward, Dell plans to incorporate credit scoring and finance services into the marketplace. It will also offer systems integration services, such as helping suppliers create electronic catalogs and, eventually, linking regular trading partners' internal enterprise systems through the marketplace.

The Next Phase

"We believe the next phase will be interconnected business networks connecting internal processes within a business to each other, such as connecting the finance organization of one company to another's to do accounts payable and accounts receivable processing," Hampton said.

David Yockelson, an analyst at Meta Group Inc. in Stamford, Conn., said the Dell marketplace offers a "complete net market operating system" for buyers and suppliers to trade complex, branded products and services online.



PEACE, LOVE & INTEGRATION

ENTERPRISE INTEGRATION DOESN'T HAVE TO BE A BAD SCENE. THE RELATIONAL
PEOPLE CAN WORK WITH THE NON-RELATIONAL. THE PDA'S CAN JUST ACCEPT
MAINFRAME DATA. CRM CAN REACH AN UNDERSTANDING WITH ERP IN DAYS,
NOT YEARS. FIGHT THE E-STABLISHMENT. BELIEVE IN SAGAVISTA. IT MEANS
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BRIEFS

Surge Expected in Holiday Web Shopping

Consumers will spend an estimated \$12 billion online this holiday season, up from \$7 billion last year, according to Jupiter Communications Inc. The New York-based research firm attributes the increase to shoppers buying more holiday gifts online and to predictions that 6 million Internet users will make their first online purchases.

EBay Sets Growth Goal

Online auctioneer eBay Inc. last week set a goal of \$3 billion in sales by 2005 based on its estimate of the size of its markets, including computers and collectibles, and the continued strength of its global business model. The goal implies sales growth approaching 50% annually over the five-year period.

Senate Committee Issues Privacy Guide

The Senate Judiciary Committee last week released a guide for consumers doing business with companies online. "Know the Rules, Use the Tools" points out that most consumers are unaware that personal information about them is being collected while they surf the Web. However, the guide noted, people are worried about giving out their personal data, such as credit-card numbers, over the Internet. The committee said such concerns can jeopardize the expansion of e-commerce.

Short Takes

George Bell has resigned as EXCITE@HOME's chairman and CEO. He will stay on as CEO until a replacement is found and will remain chairman of the broadband service provider until at least the end of next year. . . . LERNOUT & HAUSPIE SPEECH PRODUCTS NV said it's cooperating with the U.S. Securities and Exchange Commission in an investigation of its earlier financial reports. . . . Assistant Attorney General Joel Klein, who legal observers expected would argue the government's side in MICROSOFT CORP.'s appeal of the breakup order issued this spring, plans to leave his job at the end of this month.

Ariba Exchange Opens Up to Outside Buyers

Company spotlights big customer win

BY JULIA KING

ARIBA INC. capitalized on the limelight of its user conference in Miami last week by announcing a slew of features and enhancements to its electronic-marketplace software, including integration software that lets users of non-Ariba procurement software access Ariba-powered marketplaces.

Mountain View, Calif.-based Ariba also announced a major new customer, Transora.com. Transora is a Chicago-based electronic marketplace whose initial members include more than 50 global food and

services companies representing about \$500 billion in trade.

Alex Gibbons, Transora's chief technology officer, said the company opted for Ariba's software, which he characterized as "best-of-breed," after

extensively evaluating other available technologies, presumably including software from Ariba rival Commerce One Inc. in Pleasanton, Calif. Commerce One staged a dueling user conference in Las Vegas last week (see story, page 6).

Both of the vendors have repeatedly claimed to be leading the fast-growing market for software to power new digital exchanges. But many of their new

marketplace customers have yet to process a transaction.

AMR Research Inc. in Boston is forecasting that the market for software to power electronic marketplaces will reach \$1.4 billion by 2002, compared with \$124 million last year. Last week, Ariba said about half of its 150 marketplace customers are up and running.

Ariba's marketplace platform includes technology from several partners, including IBM and Dallas-based I2 Technologies Inc. for supply-chain functions and Austin, Texas-based Tivoli Systems Inc. for system management and security.

"The goal [of the integration software] is to supply an end-to-end solution for building public and private marketplaces," said John Corshen, Ariba's vice president of market development. He estimated that Ariba's partners have completed about 60% to 70% of the integration necessary to do that.



ALEX GIBBONS says Ariba's software is "best-of-breed"

BroadVision App Targets Relationship Building Online

BY TODD R. WEISS

BroadVision Inc. last week announced an application that it said would help automate and personalize the creation of business-to-business marketplaces on the Internet.

BroadVision President and CEO Pehong Chen said the MarketMaker application adds relationship management to the core task of handling transactions. He said it will allow companies to fully tailor their online catalogs to the needs of individual customers, showing only the 30 pages of items a customer buys from, rather than the whole 500-page inventory, for example.

Personalizing online catalogs can enhance relationships with suppliers, he said. "Relationships are going to be crucial to the exchanges" and not simply based on business transactions, Chen said.

MarketMaker, which is based on the firm's One-To-One Enterprise platform, will be released next week. The package is expected to cost an average of \$400,000 per company, said a spokeswoman for Redwood City, Calif.-based BroadVision.

Joshua Greenbaum, an analyst at Enterprise Applications Consulting in Berkeley, Calif., said the product expands BroadVision's offerings in the electronic-marketplaces arena. BroadVision has been leading the pack with its business-to-business personalization features, he said, while chief competitors Commerce One Inc. in Pleasanton, Calif., and Ariba Inc. in Mountain View, Calif., have provided leadership with their transaction engines and procurement components.

"They are starting to converge," Greenbaum said. "What BroadVision wants to do is get

into that part of the business," while Ariba and Commerce One are moving to implement personalization in their tools.

But one component is still missing from BroadVision's line: a supply-chain planning package that covers every base in an electronic marketplace. Greenbaum said the company has indicated that it will find a partner to add that capability, but if BroadVision wants market leadership, it should add the function now. As companies quickly get set up and involved in electronic marketplaces, he said, "user companies will need supply-chain management once they get past square one."

Personalization Is Key

The Online Asset Exchange in San Diego selected BroadVision last year for its online industrial equipment marketplace. The exchange plans to use MarketMaker to give customers personalized access, including sorting for industry types and locations of listed equipment in the marketplace, said George Marootian, chief

Integration Status

Ariba's marketplace software works with:

- IBM's WebSphere B2B integrator infrastructure
- IBM's DB2 database software
- Tivoli's marketplace management software

But analysts disagreed.

"They seem to be executing on integration, but they're by no means 70% complete," said Pierre Mitchell, an analyst at AMR Research.

What has been completed, Mitchell said, are the less complex integration tasks, such as tying in catalog management capabilities to the marketplace software. Furthermore, marketplaces that have rolled out the Ariba software are using it primarily for simplistic transactions, he added.

In its current iteration, the Ariba marketplace software "takes you to the purchase order, but after that, they fade to black," Mitchell said. "They don't have heavy-duty supply-chain capabilities." ■

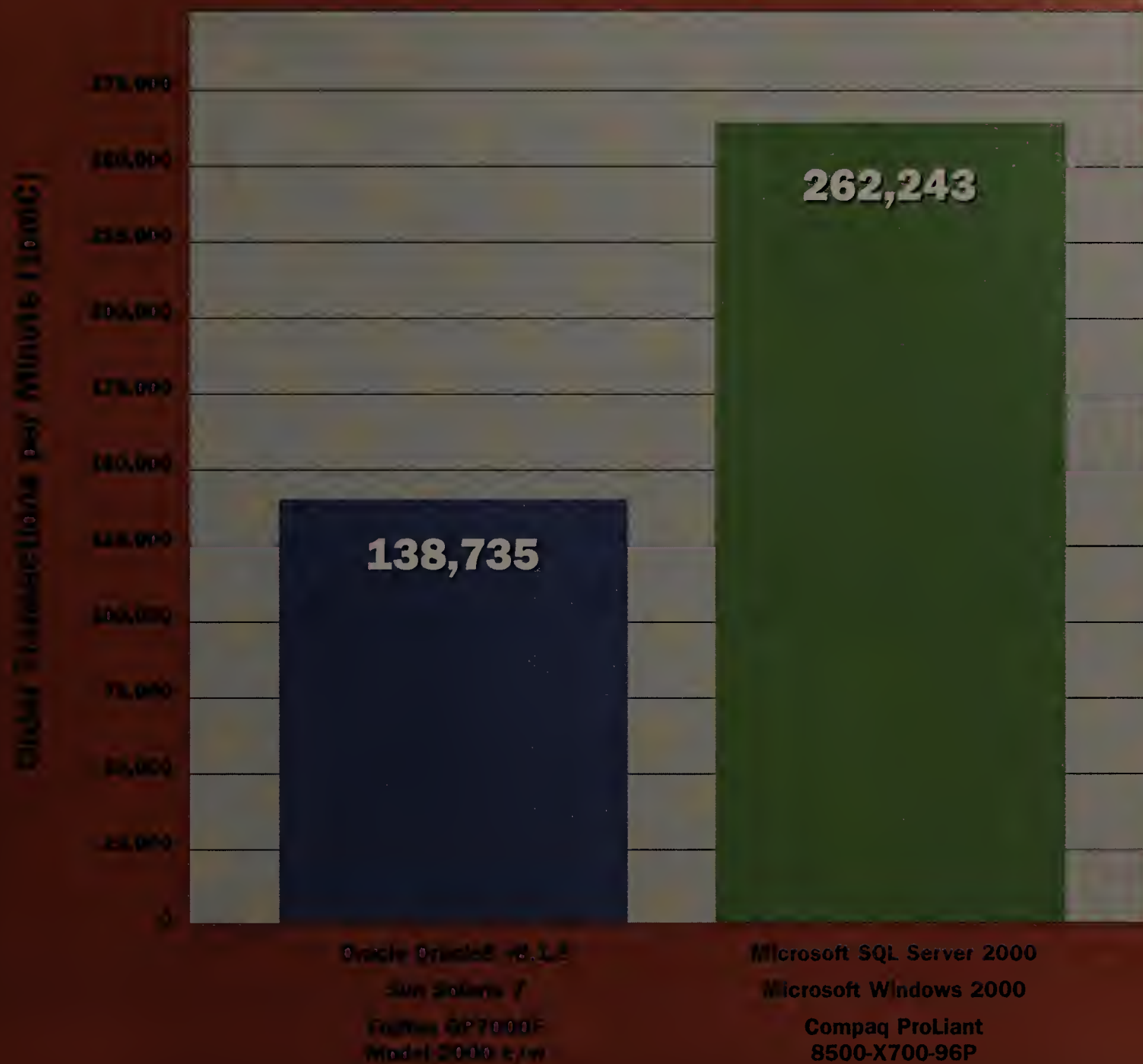
AT A GLANCE

MarketMaker Features

The online marketplace platform expands Broadvision's B2B e-commerce offerings:

- Runs on BroadVision's One-To-One Enterprise 5.5 platform
- Allows personalization of site use for customers as well as e-commerce transactions, online community creation and account management
- Integrates with enterprise data systems
- Scalable and flexible system can be expanded as needs dictate
- Costs an average of \$400,000 per company

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Based on the TPC-T industry benchmark, Microsoft SQL Server 2000 Enterprise Edition running on the Compaq ProLiant[®] platform achieved almost twice the performance at almost half the system cost.

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UPS Service Aims to Ease Online Returns

As holidays near, service targets major Web retail woe

BY LINDA ROSENCRANCE

UNITED PARCEL Service of America Inc. last week unveiled an on-line returns policy, called UPS Returns on the Web, to help consumers — and merchants — deal with goods purchased on the Web that buyers don't want to keep.

As consumers and merchants alike discovered during last year's holiday season, one of the biggest challenges to on-line shopping is making the return of an unwanted item as painless as possible for the shopper, analysts said.

Atlanta-based UPS's automated, browser-based system allows consumers to initiate returns over the Internet and provides them with on-screen labels they can print on standard paper directly from a PC.

Consumers can then take their packages to a drop-off location, hand them to any UPS driver or, in some cases, have them picked up, a company spokesman said. Once pack-

ages are shipped, shoppers can keep track of them directly via the merchant's site or through the UPS Web site.

Online retailer Buy.com Inc. in Aliso Viejo, Calif., has been piloting UPS Returns since June. Because of the service, Buy.com said, the number of calls it receives about incoming returns has been cut by 40%.

"This is exactly what UPS should be doing," said Donald Broughton, a transportation analyst at A.G. Edwards & Sons Inc. in St. Louis.

In contrast to UPS's system, Memphis-based Federal Ex-

press Corp.'s 3-year-old Net Returns service doesn't allow consumers to initiate a return request over the Internet or print return shipping labels from their PCs. Instead, they must make contact via telephone with a particular merchant using FedEx's service.

Jeff Maddock, FedEx's manager of reverse logistics, said the merchant processes the return request and schedules a package pickup at a customer's home or office by a FedEx courier, who then prints out the return shipping label.

Maddock said merchants are

Many Happy Returns

Key features of UPS's online returns service:

- **Inbound package information:** Vital package information enables precise inventory management.
- **UPS smart label:** Package information contained on shipping label is linked with the tracking number to facilitate internal returns automation.
- **Customizable e-mail:** Allows merchant to send customized messages to consumers, vendors, manufacturers or a returns depot.
- **Customer tracking:** Customers get real-time information on status of returns.
- **Proactive UPS service locator:** Users receive a URL to get lists, directions and maps to the nearest UPS drop-off location.
- **ASP structure:** Because the service is hosted by a third party, businesses benefit from complex technology without the hassle of an extensive implementation.

able to route packages to their destinations, and both merchants and consumers are able to track returned packages.

Broughton said the indicator of whether UPS is on target with its new service will be de-

termined by whether rival FedEx responds and how quickly.

Maddock confirmed that FedEx is working on enhancements to its current returns system, although he wouldn't go into detail. ▀

CEO: Orbitz 'Needs More Money Than God'

Airlines ante up to help site break new ground

BY MICHAEL MEEHAN
ORLANDO

In his first public speech since taking the helm of Orbitz, the controversial ticketing Web site that's due to launch next June, CEO Jeffrey Katz last week said the online travel latecomer needs "more money than God" to make its grandiose technical plans work.

And Orbitz needs to break new technical ground, because the first movers in the online travel business moved long ago, he said.

"For his model of doing business, he's right," said Michelle Peluso, CEO of New York-based online travel package supplier Site59.com. "They have a huge customer acquisition strategy,

and that costs big bucks."

John Ackermann, CEO of Waltham, Mass.-based corporate travel supplier e-Travel Inc., an Oracle Corp. subsidiary, called the initial investment in Orbitz "staggering." He said, "It's hard to imagine who else would be willing to make that kind of investment on largely unproven technology."

Katz said an advanced search engine being built by Orbitz would have never seen the light

of day were it not for the \$300 million being pumped into the venture by United Air Lines Inc., American Airlines Inc., Delta Air Lines Inc., Northwest Airlines Inc. and Continental Airlines Inc.

The search engine — being built with help from ITA Software Inc. in Cambridge, Mass. — will quickly sort through every conceivable fare alternative and pump the information out to users of its Web site. That kind of capability has long been a goal of the companies that operate the big computerized reservation systems.

Katz himself looked at the idea of developing such a search engine when he was managing Sabre Inc.'s reservations system during the mid-1990s. At the time, Sabre decided the project would be "too complex" to tackle, he said. But now, he added, "it turns out you only need more money than God to make it work."

For example, Katz said, Orbitz plans to install a PC server farm that can handle volumes of users "on the scale of an Amazon from the get-go." Orbitz then plans to have at least 100,000 users try out the site during a beta-test period that's scheduled to start in February.

Still, as travel sites Travelocity.com Inc. and Expedia Inc. each approach \$2 billion in annual bookings, Orbitz's launch has been delayed until June.

"If the strategy was still [just to] get in fast, we'd already be dead," Katz said. ▀

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BRIEFS

Intel Warns of Weak Third-Quarter Results

As expected, Intel Corp. stock was drubbed in morning trading Friday on U.S. financial markets as twitchy investors unloaded shares. Intel announced Thursday that slow computer sales, particularly in Europe, would lead to a third-quarter financial report that would be weaker than estimates. The company said it now expects revenue for the third quarter to be about 3% to 5% higher than second-quarter revenue of \$8.3 billion. Intel's share price was down 12.6% to \$48.87 at around 11 a.m. Friday.

ICANN Preps for Online Election

The Internet Corporation for Assigned Names and Numbers (ICANN), which oversees the Internet domain-name system, is in the final stages of preparation for a worldwide election of five new at-large members of its board of directors. ICANN's 76,000-plus registered at-large members are scheduled to cast their votes online during a 10-day period, starting Oct. 1. One director will be elected from each of five regions: Africa, Asia/Australia/Pacific, Europe, Latin America/Caribbean and North America. The election will be conducted by Election.com Inc., a Garden City, N.J., company that plans to provide secure log-in, voting response and tabulation functions.

DHL Chooses BEA's Transaction Tech

DHL Worldwide Express has chosen San Jose-based BEA Systems Inc.'s e-commerce transaction technology to serve as the foundation of the company's revamped e-commerce system. Redwood City, Calif.-based DHL will install BEA's WebLogic Server and WebLogic Enterprise systems as the backbone of an e-commerce system supporting operations in 228 countries and territories. The system will help speed up online customer services such as shipment tracking and will serve as the basis for the courier's DHL Connect service, which allows business users to ship and track express packages from their desktops.

Group Pushes for B2B Security Standards

Center for Internet Security models proposal on Visa's e-merchant guidelines

BY JAIKUMAR VIJAYAN

A SIX-MEMBER group that includes Visa International Inc., AT&T Corp., the SANS Institute and NASA is banding together to promote common, auditable security standards for companies doing business with one another over the Internet.

The group, which is calling itself the Center for Internet Security, will focus on defining and pushing the minimum security procedures and tech-

nologies that companies must implement when dealing with others over the Web, said Alan Paller, director of the SANS Institute in Bethesda, Md.

Such standards are becoming important at a time when companies are increasingly linking up with their partners, distributors and suppliers over the Internet, Paller said.

The goal is to ensure that all participants in such business-to-business environments adhere to common standards for the safety of all others on the

network, Paller added.

The Center for Internet Security will initially base its proposed standards on Visa's recently announced guidelines for online merchants for guarding cardholders' information, according to Paller.

Visa's 10 new requirements for its merchants stipulate that they must install a firewall, keep security patches up-to-date, encrypt stored and transmitted data, use and regularly update antivirus software and restrict employee access to sensitive data. Other requirements cover the assignment of IDs and passwords and the regular testing of security systems.

Organizations such as AT&T

Don't Like Carnivore? How About Altivore?

Open-source-code version of e-mail sniffer in the works

BY ANN HARRISON

Internet service providers may soon get an open-source alternative to the FBI's controversial Carnivore computer surveillance system, which delivers court-ordered information on criminal suspects.

In an attempt to give service providers a way to comply with court orders without installing Carnivore, Network Ice Inc. is developing Altivore.c, an Internet-sniffing program complete with inspectable source code.

San Mateo, Calif.-based Network Ice has released the source code for Altivore and has posted a demo of the program at www.networkice.com/altivore.

The new e-mail sniffer was developed in response to EarthLink Inc.'s questioning of the FBI's Carnivore program. According to Network Ice, Altivore gathers information from just one data stream without violating the privacy of other users. The FBI's Carnivore has been condemned

by critics who say it's a "black-box" system that conceals its source code from companies forced by court order to install it on their networks.

In addition to privacy issues, said Ed Hansen, a spokesman for Atlanta-based EarthLink, concerns persist about how any such program will affect network stability. He said EarthLink has developed its own program in-house but is looking at Altivore as well.

Programs that reveal their source code like Altivore does are much better tools for protecting the privacy of subscribers, according to Hansen.

AT A GLANCE

Alternative Snoop

Network Ice says its demo program, Altivore.c, performs functions similar to the FBI's Carnivore surveillance tool, including:

- Monitoring a suspect's e-mail (either headers or full content)
- Monitoring a suspect's access to certain types of servers (FTP, HTTP and others)
- Full "sniffing" of a suspect's Internet service provider address
- Discovery of a suspect's current Internet provider address through Radius log-on

"When we have a view into what the program is doing, we can look at the information it returns, where it is coming from [and] what it is about and ensure that we are delivering discreet information to the investigative agency," he said.

Whether law enforcement agencies will accept Altivore remains to be seen, but the FBI and the courts have said Carnivore isn't the only tool e-mail tappers can use. In July, a judge ruled that EarthLink could develop and use its own tool.

"In the best-case scenario, if an ISP chooses to construct their own intercepts with their own tools, that works out best for everyone, as long as they are in compliance with wire-tapping statutes and are willing to provide evidence on chain-of-custody issues such as how the information was intercepted and who had access to it," said FBI spokesman Paul Bresson.

Network Ice said its source code, which is intended only for programmers, still requires extensive debugging. Instructions for compiling are provided within the source code, and the company is encouraging developers to add features to Altivore, such as packet re-assembly. ▀

AT A GLANCE

Raising the Standards Bar

Visa has 10 new requirements, including the following, which stipulate that merchants must:

- Install a firewall
- Keep security patches up-to-date
- Encrypt stored and transmitted data
- Use and regularly update antivirus software
- Restrict employee access to sensitive data

and NASA, which have accumulated considerable experience defending themselves against hacker attacks, will provide technology and operational recommendations to the center.

The Information Systems Audit and Control Association, a membership-based organization in Rolling Meadows, Ill., that focuses on information technology governance, control and assurance issues, will be responsible for providing the auditing recommendations.

In Need of a Quick Fix

In a similar initiative, the National Security Council (NSC) in Washington hosted another group of security executives from several companies, including Microsoft Corp., Oracle Corp., Exodus Communications Inc. and The Boeing Co., to discuss the need for quickly setting minimum security standards for Internet-connected companies.

That group will report back to the NSC in one month with recommendations on how to move forward with such a standard, said Bill Hancock, chief security officer at Exodus in Santa Clara, Calif.

"A committee has been put together to study what kind of standards we should use, what is available out there, what needs to be created... [and] to look at organizations implementing best practices and to find out what we should be doing and what we might be doing already," Hancock said.

Much of the impetus for standard-setting comes from the growing threat to business-to-business networks posed by malicious hackers, including political interest groups and foreign governments, Hancock said. ▀

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Information and
Communications

Users: Optical Fiber Gives Copper a Run for the Money

Companies agree with findings of study

BY JAMES COPE

WHILE COPPER cable remains the standard for connecting PCs to LAN hubs and switches, optical fiber may soon be the preferred way to make 10M and 100M bit/sec. Ethernet connections to corporate desktops, according to a recent study completed in July by The Tolly Group in Manasquan, N.J.

The problem in using optical fiber has been the cost, said Kevin Wilcox, assistant vice president of technology at financial services company Fiserv Inc. in Brookfield, Wis.

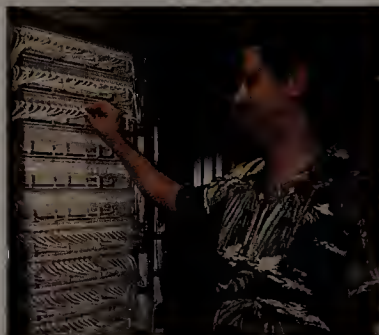
But in a recent major upgrade to the LAN that connects 1,100 PCs and other devices on Fiserv's two-building headquarters campus, Wilcox discovered that the cost to install optical fiber throughout, including horizontal runs di-

rectly to desktops and vertical cable runs to connect different floors, was about the same as using Category 5 copper Ethernet cable.

Wilcox's installers used optical fiber and connectors from 3M Co. in St. Paul, Minn.

The Tolly Group study supports Wilcox's experience.

Tolly Group analyst John Curtis, who completed the study in July, said choosing optical fiber over copper means you don't have to install work-



OPTICAL PATCH PANELS like this one are replacing wiring closets

group switches and routers on each floor of a building. Instead, networked devices in any given area are connected by optical fiber to an optical patch panel nearby. Other optical fiber runs connect these individual patch panels to a central network wiring closet in the building.

In the new optical model, Curtis said, network managers replace switches and routers with patch panels and centralize functions of the latter in a single wiring closet; there's no need to duplicate them in several intermediate wiring closets, according to Curtis. That means less equipment to maintain and the flexibility to make more network connections in less space.

Gus Jones, director of technology information at George Washington University in Washington, said that before he revamped the university's network, he hired an outside firm to compare the cost of using optical fiber and a centralized LAN architecture to that

of installing distributed architecture over copper.

The cost of installing a copper-cabled LAN in the university's administration building worked out to approximately \$250,000, Jones said. But using optical fiber was only \$5,000 more.

In the end, it took 11 closets to create an optically connected LAN covering 80 buildings

on the George Washington campus, Jones said, compared with an estimated 160 wiring closets had he used copper.

"Initially, it was difficult to find manufacturers who would put fiber ports on their LAN switches," Jones said. But Paris-based Alcatel finally came through with switches that were optical-ready.

Another reason Wilcox and Jones chose optical over cable was distance. The maximum distance for sending Ethernet signals over copper is about 100 meters, compared with 325 to 500 meters over fiber, said Mike Lynch, a 3M spokesman. ▀

Wireless, Management Top Agenda at Network/Interop

Network security, remote connectivity tools major draws

BY JAMES COPE

John Shelest was disappointed with the absence of a "technical presence" when he attended the spring Network/Interop exposition and conference in Las Vegas in May. "There were mostly sales and marketing people giving out a lot of business cards, and many of my technical questions were not being addressed," Shelest said.

Nevertheless, Shelest, a senior network engineer at Equity Residential Properties Trust in Chicago, said he will be in Atlanta this week to take in the fall Network/Interop. He's willing to put up with the sales pitches from vendors to keep up-to-date on networking trends, he said.

The two areas that interest Shelest most seem to be prominent at Network/Interop: network security and wireless connectivity. Shelest said he wants to see the new virtual private network software for remote offices from CheckPoint Software Technologies Ltd. in Redwood City, Calif. He said he's interested in using the product to secure network connections for Equity Residential's 1,000 remote offices.

Shelest is also among those interested in wireless LAN technologies that save time

and trouble in setting up networks in remote workgroups and branch offices.

Internet service provider UUnet, a WorldCom Inc. subsidiary in Ashburn, Va., said it's planning a major wireless announcement but declined to give details prior to Network/Interop.

Another busy area at the show will be network management tools. Among those planning to show their wares is New York-based Entuity Inc., which will debut its Eye of the Storm network management suite.

Mark Clayam, director of network services at application service provider Surebridge Inc. in Lexington, Mass., said his company will soon use Entuity's software to help track down and fix network problems from a central screen. Surebridge hosts enterprise-level applications for large corporate customers. "We need to be able to detect and solve problems [on the network] before a customer is interrupted," Clayman said.

Notable among the network equipment makers that will be at Network/Interop are San Jose-based Cisco Systems Inc. and Lucent Technologies Inc. in Murray Hill, N.J. Cisco will announce enhancements to its Catalyst 6000 line of network switches, and Lucent will try to give Basking Ridge, N.J.-based Avaya Inc., its enterprise network equipment spin-off, some market traction. ▀

Unified Messaging Still Needs Ironing Out

BY JENNIFER DISABATINO
SNOWBIRD, UTAH

Users and vendors at the Electronic Messaging Association conference here last week were looking for ways to integrate their various forms of corporate communications into a single messaging system. But the consensus was that despite years of hype, it's going to take time for that to actually happen.

"I think that the technology is there for a lot of it," said Clark Loffman, vice president of global messaging at Zurich-based Credit Suisse First Boston. "But I don't think that it's there to deploy on a wide... 24/7 basis."

The convergence idea — known as unified messaging (UM) — calls for the integration of all forms of messages — e-mail, voice, fax and calendaring information — into a single system that can be accessed by the user's device of choice, be

it phone, cellular phone, e-mail client or Web-based wireless device. Ideally, in such a system, text messages can be translated to voice and vice versa.

Business travelers "need to have as much with them as possible," Loffman said. "To simplify and improve life for users, many organizations would like to unify the various types of electronic communications people receive," explained David Ferris, an analyst at Ferris Research in San Francisco. "The earliest adopters are mobile executives, sales staff on the go and call centers."

Michael Goldgof, vice president and general manager of enterprise messaging at Lucent Technologies Inc. in Sunnyvale, Calif., said integrating some of the functions users want into a UM platform isn't going to happen soon.

One key application of UM would be to link customer rela-

tionship management to a user's messaging function. But that, Goldgof said, "still seems it will be a year or two out."

"[UM is] certainly not there yet," said Melissa Taylor, senior manager at WorldCom Inc. Taylor said users have been hesitant to accept the wireless element in UM because of security concerns. ▀

What's Holding Up UM Adoption?

- Most offerings don't translate from text to voice for access over the phone.
- Many UM products don't have one standard authentication protocol.
- Lack of security for wireless access.
- Ability to deploy across an enterprise.

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Dell Building Wireless LAN Technology Into Notebooks

Release of new products will drive down cost, expand wireless market, say analysts

BY BOB BREWIN

THE EVOLUTION of wireless LAN technology from niche to mainstream products took another step forward last week with the planned introduction by Dell Computer Corp. of two notebook PC models that will have antennae, and eventually, built-in wireless modem connections.

The additions to Dell's Latitude product line for corporate users follow a similar announcement by IBM earlier

this month of notebooks with integrated wireless LAN capabilities. Both companies are supporting wireless LAN antennae and modems that conform to the IEEE 802.11B wireless networking standard and are designed to work in the 2.4-GHz frequency range.

Analysts said that building the wireless components into notebook computers — instead of mounting them on the edge of plug-in Peripheral Component Interconnect (PCI) cards — should save users money and make it easier to

hook the portable machines into wireless corporate LANs. That, in turn, could help drive wider acceptance of wireless LAN technology, they said.

Pamela Roberts, vice president of marketing at Mobile-Star Network Corp. in Richardson, Texas, said built-in wireless LAN support should "help wireless take off" by relieving end users of the need to buy and install peripheral devices. MobileStar is deploying a series of public-access wireless LANs at airports and hotels around the U.S.

Craig Mathias, an analyst at Farpoint Group in Ashland, Mass., said he thinks incorporating wireless antennae and modems into notebooks will

drive the cost of the technology down to about \$75 per user by this time next year, which compares favorably with a current retail price of about \$199 for wireless LAN add-on cards.

Integrated wireless support "is a natural evolution of the technology," Mathias said. "It's a no-brainer." And while IBM and Dell can claim leadership among vendors of Intel-based PCs, Apple Computer Inc. introduced a line of portable Macintoshes with built-in antennae and drop-in radio-frequency modules last year, he noted.

Both IBM and Dell, in Round Rock, Texas, are initially offering two wireless-ready notebook PCs with prices starting

AT A GLANCE

Wireless Notebooks

Wireless LAN-ready notebooks:

- Have built-in antennae and electronics on plug-in PCI cards
- Are easier to use **right out of the box**
- Offer lower cost to consumers, with **\$100 or more in savings** over cost of current peripherals
- Use built-in antennae that reduce chances of breakage

at about \$2,500. Dell demonstrated the new Latitude notebooks at its DirectConnect conference last week, and the first model is due to go on sale today. Availability of the second system should follow within 60 days, according to Dell.

At first, users of the Dell machines will still have to use PCI-card wireless modems because the built-in modem isn't ready for shipment yet. ▀

Continued from page 1

Wireless

policyholders and net premiums of \$6.1 billion last year, plans to roll out the mobile service — which it developed in-house in just two months — in stages.

Initially, customers will be able to use their Web-enabled phones for activities such as getting price quotes, reporting claims and accessing real-time account information through the company's Web site, said Fred Khoury, Progressive's wireless Internet manager.

The Mayfield, Ohio-based insurer has also written most of the code needed to process wireless bill payments, and Khoury said he expects that capability to be up and running in a matter of weeks.

Progressive eventually plans to add the ability to push time-sensitive data to policyholders via wireless connections. For example, Khoury said, the company "could instantly deliver [information about] an auto recall notice to a customer's cell phone."

Stephen Williams, president of the Insurance Institute of Indiana Inc., a nonprofit trade association in Indianapolis, said it's "not uncommon for Pro-

gressive to be on the cutting edge with its use of technology." If Progressive is starting to take advantage of the wireless Web, other firms could follow its lead, he added.

Jeffrey Kagan, an Atlanta-based wireless technology analyst, agreed and called Progressive "the Nordstrom's of insurance because of its emphasis on customer service." The addition of wireless access to its Web site "is a simple but smart way to use technology" to further improve the company's service, he said.

Progressive decided to build its own wireless applications instead of relying on middleware vendors and application service providers. "It was not clear we could get a better application from an outside vendor than we could develop ourselves," said Khoury, who joined Progressive in June.

Progressive opted against signing a deal with major wireless carriers for "premium" placement on cellular phone-based Web browsers. But that shouldn't be a major impediment to the company's customers, Khoury said. Policyholders simply have to type Progressive's Web address into their phones or connect to the site through search engines that specialize in wireless commerce, he explained.

Khoury said the toughest part of the development project was learning how to use Wireless Markup Language, which enables firms to open their Web pages to wireless devices. "But now that we know it, we can bring other applications online quickly," he said.

Continued from page 1

Payment

Policy. The panel is trying to determine why electronic-payment systems are largely married to 1970s payment technology — a costly circumstance for businesses and consumers.

Check cashing is the biggest culprit. Paper checks remain the dominant method for pay-

The back-end systems were built to handle the Wireless Application Protocol for linking mobile users to the Internet. But, Khoury said, any data-capable cell phone should be able to access Progressive's wireless Web site by means of translators wireless carriers

have built into their systems.

A spokeswoman at GEICO Corp. said the Washington-based company takes loss reports over the Internet and has been doing so by phone for years. "It makes no difference if [the connection] is wireless or landline," she said. ▀

ing consumer bills and are also extensively used in retail and business-to-business payments. "We are the victims of our own success: We have created a very efficient check-deposit system," said Elliott McEntee, president and CEO of the National Automated Clearing House Association in Herndon, Va.

Americans write 68 billion checks annually, with an estimated combined transaction cost for businesses and consumers of more than 75 cents per check. That includes postage, bill printing and processing. In total, more than \$50 billion is spent annually on handling this payment method.

Consumers, wary of changing financial habits, have been a major obstacle to the emergence of new payment systems, said James Van Dyke, an analyst at Jupiter Communications Inc. in New York. But acceptance is growing. For instance, auction sites have ush-

ered in a new breed of financial service firms that transfer funds electronically from the bank account of the buyer to the bank account of the seller. "This is becoming the payment method of choice," he said.

But new forms of payment also face potential legal and regulatory problems, noted Thomas Vartanian, who heads the e-commerce and financial services transaction practice at Fried, Frank, Harris, Shriver & Jacobson in Washington. Both state and federal laws govern financial transactions. "Whose laws apply?" asked Vartanian.

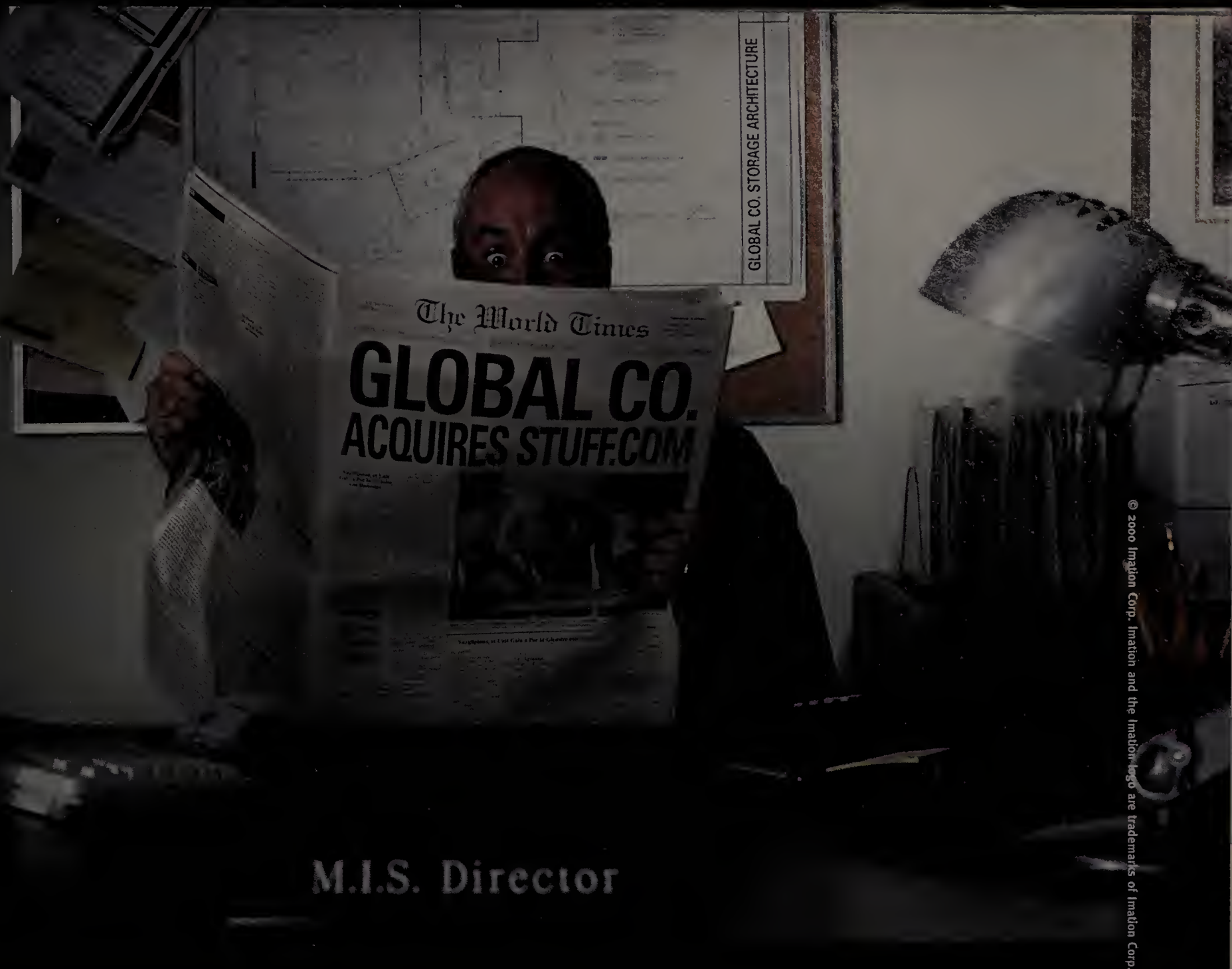
Supervalu and other companies are seeking low-cost payment alternatives. For example, Supervalu has implemented its own debit-card system in some stores.

Success will depend on a company's ability to convince consumers that these payment systems are preferable to those offered by the large financial institutions, Snyder said. ▀

Paper or Wire?

NEW HABITS: In the 1990s, electronic payments grew from 18% to 32% of all noncash payments, according to the National Automated Clearing House Association in Herndon, Va.

OLD HABITS: When it comes to paying consumer bills, paper checks still rule, with about 68 billion written annually.



M.I.S. Director

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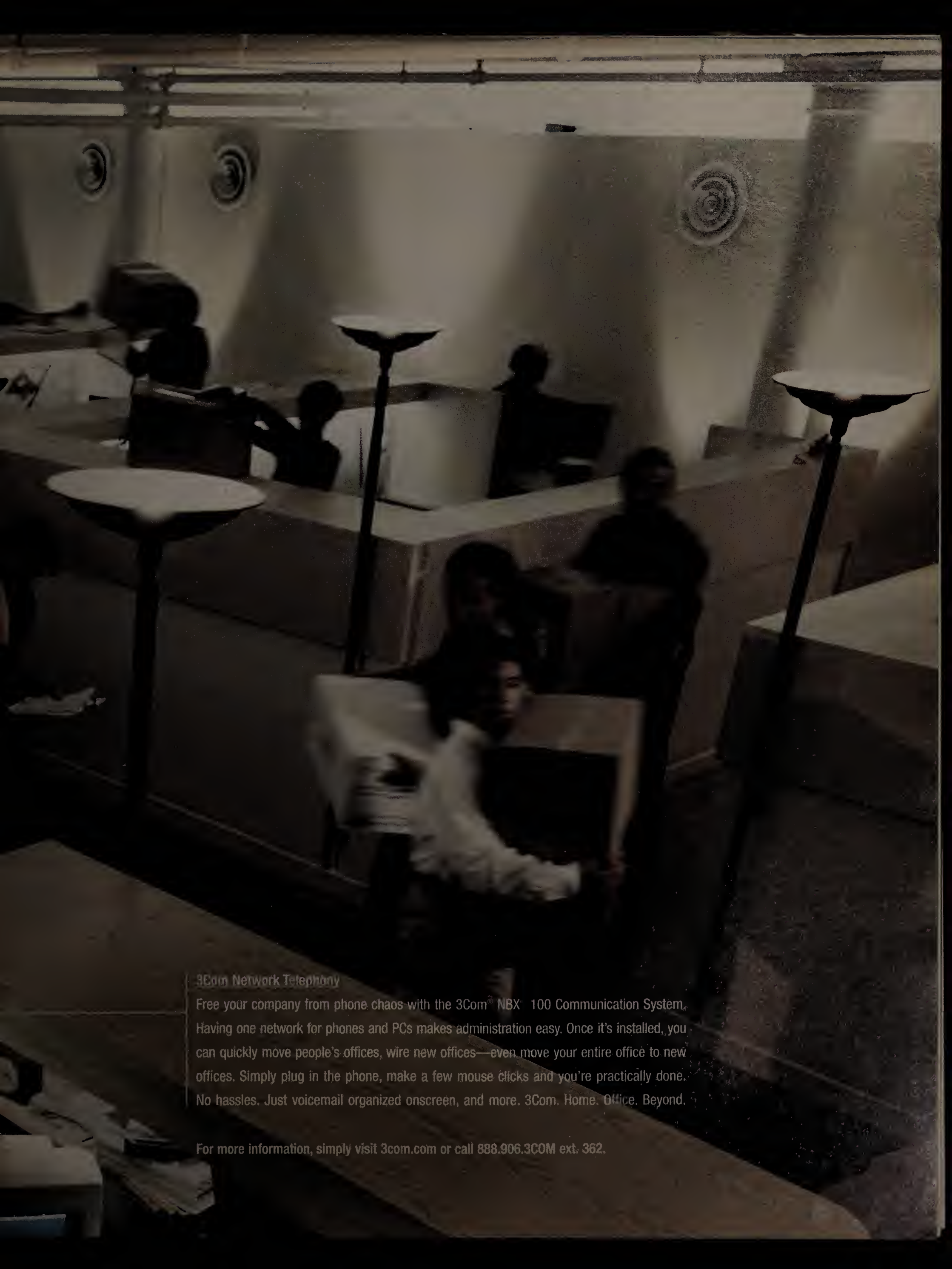
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Bigger Than Y2k

Narrowing the settlement cycle for stock trades will cost \$8B and take 3+ years

BY MARIA TROMBLY

INDUSTRY EXPERTS figure it cost about \$5 billion to prepare Wall Street information systems for the year 2000 date rollover.

But preparing for something called T+1 will cost even more.

The U.S. Securities and Exchange Commission (SEC) has urged the industry to clear and settle all trades within 24 hours — or T+1, which means “trade plus one day.” It will require a major overhaul of brokerage information systems, which have been required to settle trades in three days, or T+3, since 1995.

In essence, T+1 will force a switch from Wall Street’s traditional batch processing systems to a real-time processing network that never crashes.

The conversion to T+1 will take until 2004 and will cost about \$8 billion, according to Don Kittell, executive vice president of the Securities Industry Association (SIA) in New York and the organization’s chief T+1 planner.

The good news is that Y2k-spurred upgrades — as well as the transition from T+5 to T+3 five years ago — have helped lay much of the groundwork for this next challenge.

But the T+1 conversion may be more complicated than the Y2k conversion, and it will require an even greater degree of cooperation among industry participants than Y2k did, Kittell said.

Although stock trades seem instantaneous to retail customers — one click, and the stock is in the portfolio — the actual behind-the-scenes processing requires several steps and several days.

Both the seller and the buyer must register the transaction with a central clearing organization, Depository Trust & Clearing Corp. (DTCC) in New York. Then the two accounts of the trade have to be reconciled, errors have to be ironed out and money has to change hands. In addition, there’s the matter of handling the physical certificates.

Currently, the system works through overnight batch processes, usually run on legacy mainframes.

“This monolithic stream is the bane of our existence,” said Richard Iturbe, a vice president at Goldman Sachs Group Inc. in New York. The entire industry will now have to move to continuous processing, he said. “To the extent that your systems can operate that way, you’re ready for T+1,” he noted.

This part of the conversion will cost the industry about \$3.3 billion of the \$8 billion total, according to a report by the SIA and Chicago-based Andersen Consulting.

And the problems of converting or replacing old systems were what forced the industry to push back the deadline by two years, said Larry Tabb, an analyst at Needham, Mass.-based TowerGroup. The

T+1 conversion was originally planned to conclude in 2002.

San Francisco-based Charles Schwab & Co. has already started working on replacing its batch processing systems, according to Vincent Phillips, senior vice president of electronic brokerage technology. He said Schwab has already worked on more than half of its legacy systems, not just because of the coming T+1 conversion but also because of decimalization — and customer demand.



CIO KURT WOETZEL says The Bank of New York has been preparing for T+1 since 1995

“Our customers want more and more and more real-time data,” he said. People who were satisfied with day-old data a short while ago now get frustrated if their accounts aren’t updated instantaneously, he said.

But replacing the legacy systems — though a big headache and major expense — will pale in comparison with the larger difficulty of getting all the players in the securities transaction chain to work together, said Tabb.

“[What] they’re going to have to deal with is the political problem of getting everyone to agree on how it’s going to work,” he said.

One key link in the chain is DTCC, the clearinghouse for trade settlements. It not only has to upgrade all its internal processes but also all its links to the other industry players.

“We’ve been working on this for at least a year and a half or two,” said Steve Letzler, a spokesman for the DTCC. Although Letzler couldn’t confirm the numbers, the SIA said it expects DTCC to spend more than \$100 million to prepare for T+1.

DTCC has begun to eliminate its overnight batch processing, moving to a multi-batch system with Nasdaq Stock Market Inc. and five electronic communication networks. A multibatch system replaces one overnight process with a series of batch processes that run throughout the day.

In addition, DTCC has formed a real-time link with the New York Stock Exchange, which handles about 300,000 large trades daily.

“Eventually, we’ll get to the other systems and get everyone to real time,” Letzler said.

A Step Ahead

Another firm that planned ahead for T+1 conversion is The Bank of New York Co., which provides settlement services to more than half of the broker dealers in the U.S. CIO Kurt Woetzel said he’s been getting ready since the move to T+3.

“Starting in 1995,” he said, “any new applications that we built were engineered around the following factors: They reflect information in real time and process information [in] real time, and they’re message-based, rather than moving files around.”

Although there are still batch processes left, the critical systems — including those for delivering information to customers and taking transactional information from customers — are already running around-the-clock, he said.

The SIA will publish the technical standards for T+1 conversion by the end of next year, with full compliance expected to come by the middle of 2003. ▀

A Voluntary Industry Effort To Reduce Risk

Unlike Y2k, which had the clear deadline of Jan. 1, T+1 is a voluntary industry effort so far. Its primary goal is to reduce the risk of a chain reaction of financial disasters, said Don Kittell, executive vice president of the Securities Industry Association (SIA).

Shorter settlement cycles lead to increased stability for the entire global banking system, said Deborah Williams, an analyst at Meridien Research Inc. in Newton, Mass.

Just as a bounced check can have a ripple effect when you’ve already written other checks based on those funds, large trading firms can have the same problem that ripples throughout the financial world, Williams said.

It isn’t a hypothetical problem, either. In 1987, when a market downturn caused a few securities firms to go under, the five-day settlement period meant the problems rippled throughout the industry, causing other firms to fail. This spurred the move from T+5 to T+3, said Kittell.

If trades were settled instantaneously, the risk involved would be nonexistent. The SIA will, in fact, begin studying the feasibility of T+0 in the next year or two.

The U.S. securities industry is also facing competition from overseas. Hong Kong and Singapore already are at T+1, Kittell said, with Japan and Europe heading in that direction as well. By beginning the process now, the U.S. will maintain its leadership position, he said.

The switch to T+1 will also allow the industry to handle increased volume. The current batch processes are coming close to their capacity limits, Kittell said.

Yet another reason to switch to T+1 is that it will save industry participants money — about \$2.7 billion per year, according to an SIA study — meaning that the overhaul will pay for itself in three years.

The savings will come from reduced manual processing, lower error rates and faster payments, the SIA said.

— Maria Trombly

T+1 Timetable

The move to settling stock trades in just one day will cost \$8 billion and take several years.

Q2 2001

► Specifications for settlement process to be determined

Q4 2001

► All firms must commit to build or outsource new internal processes that can handle T+1
► Deadline for industry to agree on standardized communication protocols

Q1 2003

► Transition to T+1 begins

Q2 2003

► All participants must be compliant with industry communication standards.

Q2 2004

► Transition to T+1 to be completed

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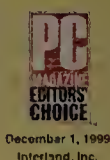


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Yahoo to Feature Barnes & Noble; Amazon Deal Expires

But Amazon has AOL and other financial concerns, say analysts

BY KATHLEEN OHLSON

BARNESANDNOBLE.COM Inc. and its parent company, New York-based Barnes & Noble Inc., last week announced an agreement that makes the online retailer the featured bookseller on Yahoo Inc.'s Web sites. Yahoo previously had a similar deal with Barnesandnoble.com rival Amazon.com Inc.

"Barnes & Noble has taken a fairly cautious approach to its Web business, unlike Amazon, which has thrown lots of money around," said Harry Wolhandler, an analyst at ActivMedia Research LLC in Peterborough, N.H. The Yahoo deal will boost Barnesandnoble.com's profile, giving the online bookseller a chance to grab some of Amazon's customers, he said.

Under the deal, links to Barnesandnoble.com will be included on all Yahoo search results and book category

pages, and the site will be featured on Yahoo's online shopping portal. The physical bookstores, along with Yahoo and Palo Alto, Calif.-based online advertiser Spinway.com Inc., will offer free Internet access to Barnes & Noble customers, starting next month.

Gus Carlson, a Barnesandnoble.com spokesman, declined to detail the terms of the

agreement, but he characterized the deal as "significant."

Santa Clara, Calif.-based Yahoo had a similar deal with Amazon, but Amazon opted to stick with its other portal partner, America Online Inc., when its three-year deal with Yahoo expired earlier this month. Lizzie Allen, a spokeswoman for Amazon, said Dulles, Va.-based AOL offered a "more

compelling" deal, but she declined to elaborate.

Robert Hertzberg, an analyst at Jupiter Communications Inc. in New York, said Amazon has financial problems to consider. It posted an \$89 million operating loss for the second quarter, ended June 30, compared with a loss of \$67 million for the same period last year.

"Yahoo isn't as critical to Amazon as it was three years ago. ... Amazon's under pressure to rationally deploy its marketing dollars, and it's

“
Yahoo isn't as critical to Amazon as it was three years ago.

ROBERT HERTZBERG, ANALYST, JUPITER COMMUNICATIONS INC.

started to do that by limiting its portal expenditures," Hertzberg said.

But Allen said Amazon's decision to part ways with Yahoo had nothing to do with any external pressures. ▀

Merant Opens Online Development Service

Source code to be accessible over Web

BY LEE COPELAND

Unlike the typical application service provider (ASP), U.K.-based Merant PLC not only wants to host applications, but it also wants to allow developers to create them.

Merant recently launched Merant ASaP, which gives developers access to source code and code-management capabilities over the Web.

The Merant ASaP portal will allow customers to access their

own source code from a Web browser and tap into version-control capabilities. The service also offers instant chat, e-mail and the ability to capture project documentation online. Merant officials said the service is applicable to any development language.

Intel Online Services Inc., the ASP subsidiary of chip

maker Intel Corp., is hosting the service for Merant.

Rousseau Aurelien, CEO of Cambridge Information Systems Inc., a start-up in Cambridge, Mass., said Merant's ASaP service helps bridge the gap between the firm's two offices in Cambridge. The start-up's 25 developers began using the service two months ago.

"Traditional tools are not well suited for high levels of collaboration among a distributed workforce," Aurelien said.

Kneko Burney, an analyst at Cahners In-Stat Group in Newton, Mass., said the ASP model is a sound platform to connect developers in disparate locations. "The Web environment enables developers to design applications more quickly and easily," said Burney.

Hosting Advantages

Rob Enderle, an analyst at Giga Information Group Inc. in Cambridge, Mass., said development services hosted by third parties offer the advantage of not locking developers into a particular tool set or platform.

"What ASPs have become are aggregators of services," he said. "It's very similar to cable, where the companies provide a set of channels from a wide number of providers, like HBO and ABC, so viewers have lots of options. But in the early years, you were hard-connected to just one provider."

Pricing for ASaP starts at \$2,500 to set up the service, plus additional charges of as much as \$100 per user per month. ▀

Banks Release Smart Cards

BY MARIA TROMBLY

The U.S. has lagged behind Europe when it comes to smart-card technology, with New York-based American Express Co.'s Blue card being the only credit card on the market with an embedded chip.

But that's about to change, as three banks have announced plans to release Visa smart cards. Providian Financial Corp. in San Francisco and FleetBoston Financial Corp. in Boston are launching the cards this month, and First USA Bank NA in Wilmington, Del., will launch them sometime in the fourth quarter.

According to bank officials, the cards will provide greater security for online shoppers, reduce costs for Web merchants and allow for services such as electronic ticketing.

"The technology and eco-

nomics now make it viable," said Jay H. Lee, a senior vice president at FleetBoston.

A year ago, the embedded chips cost \$12 each; now, the price has dropped to around \$3 each, Lee said. In addition, the industry has started to converge on standards — Java Card for the applications that are stored on the smart-card chips and Europay MasterCard Visa (EMV) for payment processing.

"This is the standard," said Theodore Iacobuzio, an analyst at TowerGroup in Needham, Mass. Not all cards use EMV yet; many European systems use proprietary standards, as does American Express with its Blue card. "But people are moving in that direction," he said.

There are two hurdles to

widespread adoption, said Frank Prince, an analyst at Forrester Research Inc. in Cambridge, Mass. Consumers have to be persuaded to use them, and merchants have to shell out the money to install smart-card readers. "It's a chicken-and-egg problem," he said.

The banks will try to overcome that problem by issuing

around \$20 each, according to David Alvarez, who heads the integrated card business at Providian.

The readers will allow smart cards to be used with online merchants, which only have to install software.

Merchants with brick-and-mortar stores, on the other hand, will need to install new readers to accept the cards. It's for that reason that smart cards will continue to also have a magnetic stripe for many years to come, Iacobuzio noted.

The cards will also have embossed numbers for those merchants that still have nonelectronic swipers.

Meanwhile, a handful of other Visa card issuers are expected to release their own smart cards in the next few months, which will encourage even more merchants to get involved, Alvarez said. ▀



VISA SMART CARDS like this Fusion Cobalt Blue card are starting to hit the U.S. market

free readers to their customers. Providian, for example, will give out 50,000 readers. After those run out, customers will be able to buy them for



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More.com Denies It Violated Privacy Policy

BY LINDA ROSECRANCE

Online health products retailer More.com last week defended its privacy policy in the wake

of a Missouri lawsuit claiming the firm violated that policy.

The lawsuit said More.com released customer data to a

third party after promising that it wouldn't. A spokeswoman at More.com referred calls to a company statement, which said

the San Francisco-based firm couldn't comment on the lawsuit pending an investigation of the claim by the Missouri Attorney General's Office.

However, More.com said in the statement that it had fol-

lowed its privacy policy, which says the retailer will share information with third parties who fill orders for the site. "As a company policy, More.com does not give, sell or rent customers' personal information to third parties," the statement said. The lawsuit alleged that More.com released a customer's personal information to a third party after an investigator at the attorney general's office tried unsuccessfully to order contact lenses under an assumed name.

The attorney general said the investigator was solicited by Lens Express Inc. in Deerfield Beach, Fla., to purchase contact lenses under the assumed name, even though the investigator had never contacted Lens Express. However, More.com's privacy policy states that it uses a third-party fulfillment partner — in this case Lens Express — to fill and ship contact lens orders.

Scott Holste, a spokesman for Missouri Attorney General Jay Nixon, said it's up to the courts to decide whether or not More.com made a full and accurate disclosure of its policy to its customers.

Edmund Ha, an analyst at Giga Information Group Inc. in Cambridge, Mass., said, "There are really no cyberlaws in place. But if [More.com] had a disclaimer on its Web site [saying it shared customer data with third-party partners] before the lawsuit was filed, they are certainly within their rights to give out that information to their partners." ■

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A close-up, low-angle shot of a woman's face, looking upwards with a slight smile. In the background, a tall, modern skyscraper with a grid-like window pattern rises into the sky. The lighting is dramatic, with strong shadows.

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BRIEFS

CA Sells Sterling's Federal Unit

Los Angeles-based defense contractor Northrop Grumman Corp. said it has agreed to purchase the federal systems group of Islandia, N.Y.-based Computer Associates International Inc.'s Sterling Software Inc. subsidiary for \$150 million. Northrop Grumman said the Sterling unit will be incorporated into its Logicon Inc. unit in Herndon, Va., which had revenue of about \$1.5 billion last year.

Sun to Buy Maker of Server Appliances

Sun Microsystems Inc. said it plans to acquire Cobalt Networks Inc., a small and still unprofitable maker of Linux-based server appliances, in a stock-swap deal valued at \$2 billion based on the current price of Sun's shares. The purchase is scheduled to be completed by year's end, according to Sun. Mountain View, Calif.-based Cobalt targets its appliance devices at application and Internet service providers and at small and medium-size corporate users. The 3-year-old company lost \$8.6 million on revenue of \$28.3 million in the first half of the year, after reporting a \$22.3 million loss on revenue of \$22.8 million for all of last year.

Short Takes

Minnetonka, Minn.-based fiber-optics company **ADC TELECOMMUNICATIONS INC.** has agreed to acquire Westboro, Mass.-based broadband developer **BROADBAND ACCESS SYSTEMS INC.** ... **COREL CORP.** said an unnamed investor may purchase up to 14.7 million shares of the company during the next two years. ... Mary Coleman, who ran **BAAN CO.** for seven months before leaving the struggling applications vendor, was named CEO of **RIGHTWORKS CORP.**, a San Francisco-based company that develops business-to-business software. ... Dublin-based **BALTIMORE TECHNOLOGIES PLC** announced that it's acquiring U.K.-based **CONTENT TECHNOLOGIES HOLDINGS LTD.** for \$1 billion. Content Technologies' MIMESweep policy engine inspects Web content and screen data.

Andreessen Targets Web Outsource Model

Ease of software use 'reduces barrier of entry' for large firms

BY CAROL SLIWA

LLOUDCLOUD INC., the latest venture of Netscape Communications Corp. co-founder Marc Andreessen, marks its first anniversary as a company this month. Thus far, Sunnyvale, Calif.-based Loudcloud has signed up 30 customers of the Web infrastructure technology that it develops and then runs on an outsourced basis for large companies, e-commerce businesses and application service providers.

Andreessen, who is Loudcloud's chairman, recently spoke with *Computerworld* about his new company — which has 370 employees and is backed by more than \$188 million in venture capital financing — and about the software business in general.

Q: It's surprising to see you turn up in a nitty-gritty infrastructure company. What interested you in Loudcloud?

A: We're all technology people. We said Netscape was always a technology company. This is a technology company in many ways. The truth is, this is an actual business with revenue. Our customers pay us mid-five-figures to mid-six-figures of revenue per month for [our] service. ... This sort of comes full circle with much of the stuff we saw at Netscape. Netscape was a commercial software company with all of the typical characteristics of a commercial software company. We'd take all of the customer's money up front, we'd throw the software over the wall and the customer would have to work with it. ... The financial model of a software company is you have to move on to your next customer, because you have to go get next month's revenue. And so as a result, there's a tremendous amount of software that got built at Netscape that never got effec-

tively deployed by customers. And it's endemic to the commercial software industry that there's this misalignment of interest between the vendor and the customer, where the vendor's not necessarily incented by customer satisfaction. And therefore, the customer is not necessarily incented to treat the vendors particularly well.

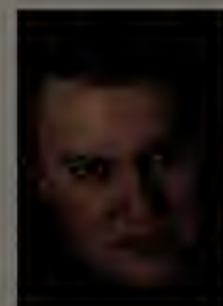
Q: It seems like a real hate/hate relationship.

A: It's a nasty business. You know, Gartner Group trains customers how to screw software vendors by doing negotiations on the last day of a quarter and [about] the nature of the software business — huge investments and zero marginal costs. Therefore, the customer knows that the vendor can actually produce the next copy of the software for free, so prices trend to zero. And the only way out, the only profit mantra in the software business, is to be a monopoly. ... There are all these sorts of nasty aspects to the [software business] model. It's incredibly inefficient. And the situation gets worse and

worse and worse and worse and worse all the time because the software keeps getting more and more complicated. And then you look at the Internet, and you say, "Wow, a high-speed network interconnecting all businesses." ... Businesses should be able to go out there and pull down [the information technology] resources they need, all kinds of services ... on an outsourced basis. ... And it really reduces the barrier of entry for any kind of large-scale Internet operation, where we are stripping the technological complexity out. ... If we can pull this off, it'll be a pretty fundamental breakdown of how this business was created.

Q: When do you think your company will become profitable?

A: For the company, I won't talk about it. But the [strategy] is to acquire customers and then keep them for a long period of time. We get paid every month.



ANDREESSEN: "It's a nasty business"

And the [business] model also is to build out infrastructure and then fill it up to a high percentage of utilization over time. So like a telecom company, you'll be able to look at us from a financial standpoint on a per-customer basis or ... evaluate us per unit of capacity.

Q: Your company talks about building "Opsware automation technology." What is that?

A: It's software that we built for provisioning, managing and scaling our infrastructure. We do provisioning of everything but the CPUs. So [it's] app servers, databases, customer code, customer content, networking configurations, security. It's provisioning of that, and then it's [hardware] management of that, and

then it's scaling of that. It makes it really easy for people to start out. It also makes it very easy for people to scale, because if you're growing, you just bring [capacity] online as you need it as opposed to having to make a capital investment. ... If you don't need it the next month, we bring the capacity back down again. We can use it to run another customer. ▀

Informix Splits Into 2 Separate Companies

BY DAN VERTON

Hit by weak sales that are expected to result in a third-quarter loss, Menlo Park, Calif.-based Informix Corp. last week announced that it's splitting into two separate operating companies — one focused on its flagship databases and the other on Web publishing, e-commerce and business intelligence software that will work with multiple databases.

The breakup follows Informix's March acquisition of Ardent Software Inc., a data warehousing vendor in Westboro, Mass. The as-yet-unnamed business intelligence and e-commerce venture will be headquartered at Ardent's facility, while the database company — to be called Informix Software — will be based in Silicon Valley.

Informix previously said it would have 3,900 to 4,000 em-

ployees after last month's layoffs and the planned hirings of some new sales and support workers. Last week, the company said the two separate companies will have a combined workforce of about 3,400 people.

In addition, the company warned that it expects to report a third-quarter operating loss of \$15 million to \$24 million, which will be widened by restructuring charges and other one-time expenses totaling as much as \$90 million.

Meanwhile, the Informix Software database operation will try to breathe new life into the company's core database technology. The database company, which expects revenue of \$780 million to \$800 million this year and will start out with 2,300 employees, is expected to be run by Jim Foy, another former Ardent executive who

was named a senior vice president at Informix last month.

In an attempt to revitalize its database sales, Foy said, Informix has a new technical architecture on the drawing board, after having recently completed a detailed analysis of its existing technology.

One More Chance

Consulting firm AMR Research Inc. in Boston described Informix's breakup move as "a last-ditch effort to reinvigorate" the company's database business.

The move may have come too late to help Informix take back much database market share from Oracle Corp. and other rivals, AMR said. But, the company added, the new management team from the Ardent side of the company "is showing it can make tough decisions and is ready to fight." ▀

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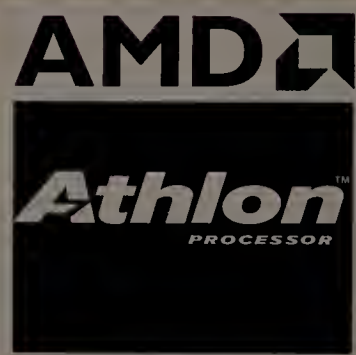
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YOU'D SMILE TOO IF YOU'D JUST BEEN NAMED



The editors of PC World magazine judged hundreds of products based on performance, consistency, innovation and value. Their verdict? "AMD's Athlon Processor is a superstar in all four" and "Athlon-based PCs sprinted to the top of our corporate and home PC charts." These are just a few of the reasons that they chose the AMD Athlon™ processor as "Product of the Year." You'd think



PC WORLD MAGAZINE'S PRODUCT OF THE YEAR.

we'd be used to this by now. After all, AMD Athlon processors have already won more than 65 awards worldwide. But when we hear things like "record-breaking performance," "architecturally superior to Intel Pentium III" and "the first to hit a clock speed of 1 gigahertz, beating Intel at its own game," we still can't help but grin. You will too when you see what an AMD Athlon processor can do for your productivity. Log on to www.amd.com/pcworld.

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MARYFRAN JOHNSON

Superman syndrome

HAVE YOU HEARD THE ONE about the health care company searching for a new CIO? It isn't asking for much. Just a candidate who can provide outstanding leadership in all things IT, understand finance and business operations, grasp the nuances of clinical processes,

care deeply about managed-care philosophies and (naturally) have an advanced degree in a health care field or computer science. Leaping tall buildings in a single bound is encouraged but strictly optional.

I'm not making any of that up. Well, maybe the part about leaping buildings. But when you look across the IT careers landscape today, it's blanketed with a crazy quilt of expectations and demands that seem as out of whack with reality as dot-com valuations used to be. Not only is the nature of IT work changing and growing, but so too is the long list of "must-have" skills. As the headline on a Careers story in this issue (page 62) aptly describes it, "Wanted: Security Superman."

Problem is, Superman was essentially a consultant. He flew in at the last possible minute, made a flashy rescue, nodded heroically to the grateful citizens and then retreated to anonymity as mild-mannered Clark Kent. He had a limited repertoire of skills (superhuman strength, X-ray vision and the ability to fly) that were ideal in certain dire situations but pretty useless the rest of the time. He wasn't a leader. He was a rescuer.



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When you think about the kind of IT that successful companies need today, you realize how the Superman syndrome causes more problems than it solves and actually fuels all the wrong expectations. Superheroes can't be bogged down with mundane chores like leading diverse teams, managing people, seeking opinions from their business colleagues, sanity-checking their own technology biases or thinking about customer needs. Step aside, please. There's a building to leap.

Of course, Superman's days may be numbered anyway, if the world as seen by a handful of futurists materializes (see "Darker Days Ahead," page 57). They claim that the IT worker shortage will vanish within five years as non-IT people flock to the field and that the globalization of technical skills will disperse software development around the world. They also say the best IT people will emerge as the ones with "soft" skills in managing, communicating and leading.

The pundits are probably dead wrong about the details but right on about the trends.

So let's call off the search for Superman. He never was much of a team player, anyway. ▀

ERIK SHERMAN

Don't neglect desktop when it comes to security

MICROSOFT FINALLY allows some user control of cookies with Internet Explorer. Napster appears on tens of millions of PCs, and security experts wonder if hackers could use it to invade a system. Advocacy groups express alarm at the amount of user profiling on many corporate sites.

Issues for consumers? Of course, but don't shrug them off. Client security has become the most neglected and vulnerable link in the corporate IT infrastructure.

Sometimes the problem is blatant, like unsecured dial-in lines connected directly to a PC.

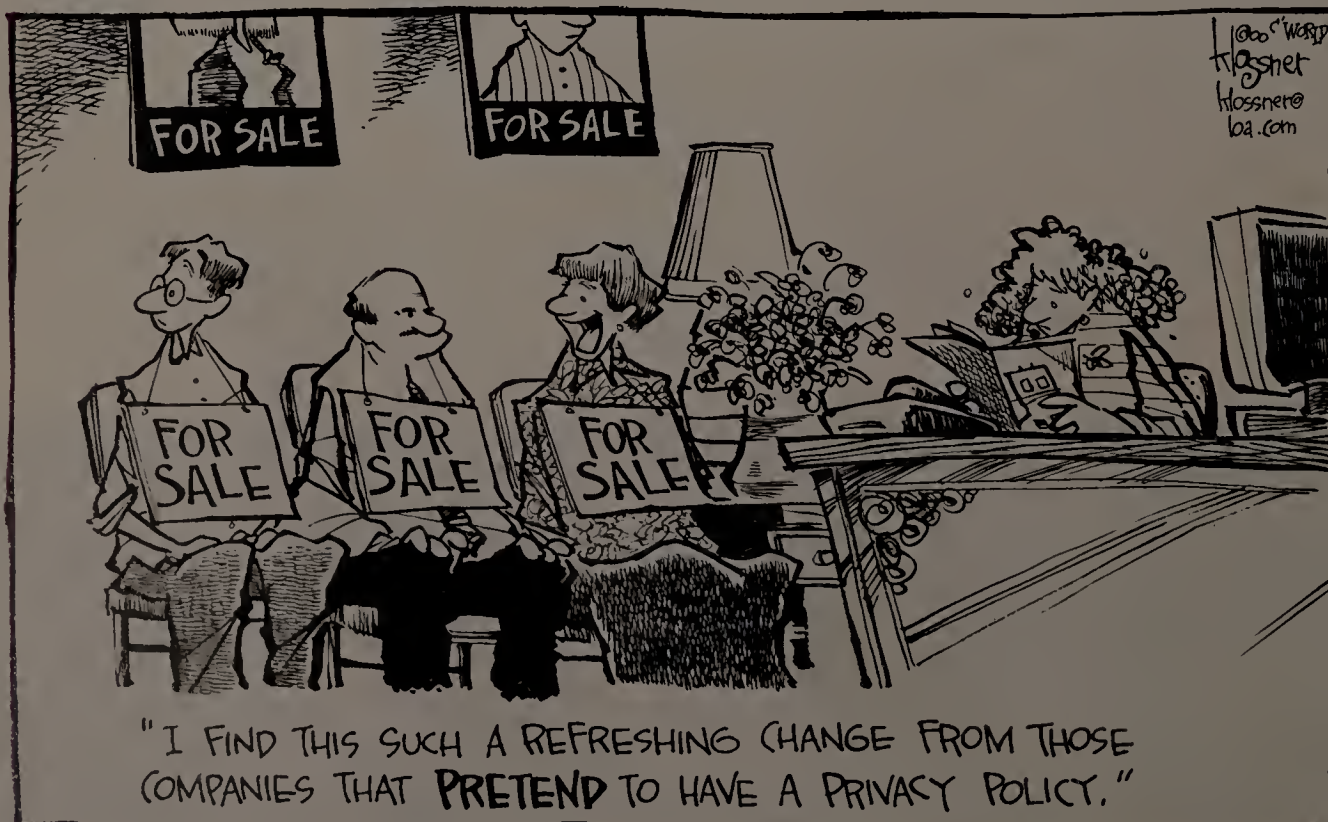
According to George Kurtz, one of the authors of *Hacking Exposed* (Osborne/McGraw Hill; 1999) and CEO of Foundstone Inc., a security consulting company, it's possible to break into a corporate network through dial-up connections more than 90% of the time. That risk extends to the home, where PCs — especially with always-on, high-speed Internet connections — get probed 10 to 20 times a day.

Since most home PCs aren't configured to detect and repel such advances, the chances are significant that the more criminally minded could take over such machines. Add a VPN connection into a company's network, and the entire business — potentially — is laid open. Software such as Napster or Gnutella actually invite outsiders onto a hard drive to swap MP3 files. Can a user get anything more than music? There have been no reports of a security failure in such applications, but who would have thought a flaw in Microsoft Outlook (now corrected) would allow hackers to have it run software, like a virus, for them? Betting on the invulnerability of code is like using the lottery as a sole form of retirement planning. Think Napster is missing from your clients? Kurtz tells of finding the program on the production server of a major e-commerce company.

And it gets worse. Imagine that someone could look over the shoulders of developers, engineers, marketing people and business planners to track the Web sites they opened. Those performing product or market research on the Web could leave a visible trail. Such information would be a gold mine to competitors. Even cookies could provide much of this information, let alone surreptitiously placed sniffer programs, and we



ERIK SHERMAN is a writer in Marshfield, Mass., who regularly covers technology and business issues. Contact him at esherman@reporters.net.



haven't even started talking about breaking into e-mail. Whether the competitor does the actual snooping or simply buys the information from a third party is immaterial.

Security spending and awareness are typically directed toward servers. It's time to remember that the biggest breach happens at the weakest link in the chain: the desktop. Corporations should treat client machines seriously by thoroughly examining security and updating end-user policies. Insist that Internet software vendors provide strong privacy control. Sure, adding such abilities means that gathering information on your customers would be harder, and that would make the marketing department unhappy, but is selling an extra widget to John Smith really worth leaving the company's back door unlocked? ▀

DAVID MOSCHELLA

The laptop era is nearing its end

HOW LONG DO you think it will be before traveling businesspeople mostly leave their laptops at the office, or perhaps dispense with them altogether? In a world with more than half a billion PCs in use, the idea of schlepping your own machine around just to connect to the Internet has clearly seen its day. The only question is how quickly this unwanted weight will, literally, be taken off our shoulders.

Since I mostly carry a laptop to keep up with my e-mail, I see this issue in two main questions: How well do pure Web-based e-mail systems work? And how easy is it to get access to a PC or some other

Web-enabled device from wherever I am likely to be? Sadly, in both areas, there are still quite a few obstacles, but real improvements are clearly on the way.

My company uses Web-based e-mail from an ASP that has been recognized as a market leader. Yet despite this impressive credential, the company's pure e-mail experience remains inexplicably slow. A service that works great when client software such as Microsoft Outlook resides on a particular PC

somehow turns to sludge when accessed through any standard browser. Suffice it to say that if you're thinking about relying solely on Web-based e-mail, don't take response times for granted.

On a more positive note, keeping up with my personal e-mail while away from home has never been easier. For the past few months, I have been

using a free service called Mail2Web. From any PC with a Web browser, I can read and reply to mail sent to my Earthlink address. The service is so simple and fast that I'm surprised most ISPs don't offer this capability themselves. It's nice not to come home to an overflowing in-box.

Unfortunately, getting access to PCs while traveling remains much more difficult than necessary. Even though in-room Internet access would mean much more to business travelers than warm cookies, VCRs or bonus points, few hotels have responded. The one I stayed in earlier this month in London was typical. The business center was open from 7 a.m. until 10 p.m., offering two Internet-connected PCs at a rate of \$25 for 30 minutes. If used just four hours a day, that's \$7,300 per year per PC.

Fortunately, an attractive, partial solution is already available. Until hotels and airports get their acts together, businesspeople should rely upon one another's PCs. Just as companies provide vis-

itors with beverages, bathrooms and phones, courtesy will soon require asking if a guest would like to connect to the Internet. By spending a little time online before or after business visits, travelers could avoid having to slog through their messages when they get back to their hotels.

Think about it. Road-warrior psychology might soon turn full circle. Not having a laptop could suddenly become cool, while having to lug around an expensive machine just to use your outdated client software could become almost as embarrassing as not having e-mail became in the mid-1990s.

I've always thought that in a truly network-centric era, client/server e-mail products such as Outlook and Notes should be unnecessary. We're not there yet. But as networks become faster, Web services become more sophisticated, and business netiquette evolves, the end is coming into sight. And as the client/server model fades, carrying your own client will become the exception, not the rule. ▀

READERS' LETTERS

Survey freeze-out

I WAS DISAPPOINTED that *Computerworld's* Annual Salary Survey ["Rising in Riches," Business, Sept. 4] once again ignored my profession, technical writing. Technical writers are a key component in the software development process, documenting everything from programming standards to operations documents to user materials. We also frequently participate in creating design documents, standards, sales proposals, sales material, configuration management documentation,

test scripts, functional descriptions and more.

Diana M. Ost

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webmaster
Tampa, Fla.
Diana_Ost@excite.com

The hype for ClearType

IN RUSSELL Kay's article "Copy Protection: Just Say No" [Technology, Sept. 4], he refers to "ClearType's technological brilliance." That's somewhat like someone touting the virtues of antiskid brakes on a new car. ClearType is old technology, which removes its polish. I am not disputing the usefulness

of subpixel technology; however, Microsoft didn't do anything new here.

Dan Van Fleet

IT manager
Equity Land Title Agency Inc.
Vandalia, Ohio
danvanf@yahoo.com

Russell Kay responds: *It's true that the technology (or at least the idea of it) was demonstrated many years ago, but there was no real-world presence or technology until Microsoft decided to do something with it, and that's what's worthy of praise and recognition.*

Know your security

YOUR ARTICLE about security certifications ["Secure With Your Security Pros," Technology, Aug. 14] points out the need for employers and recruiters to understand exactly what they require to fill a job opening. The difference that prospective employers and recruiters should be aware of is that if they are looking for a senior level "hands-on" engineer type, they should look for a GIAC certification. But if they need a senior manager or consultant, they should look for a CISSP.

Personally, I would want my hands-on security team members to ob-

tain at least one GIAC certification, and I would want my management and consulting teams to at least have their CISSP certification, and if they had a GIAC certification, that would be even better.
Michael D. Tonick, CISSP
Senior security consultant
Perot Systems Corp.
Dallas

Somebody's watching

AS I RESPONDED to *Computerworld's* Sept. 13 online survey — "Should companies be barred from secretly monitoring workers' e-mail and Internet usage?" — I couldn't help but wonder if anyone in my company was secretly observing and making note of my "yes" vote.

And now as I send this e-mail...

Jack Kaufman

Senior programmer/analyst
Ingersoll-Rand Corp.
Athens, Pa.

More Letters, page 44

COMPUTERWORLD welcomes comments from its readers. Letters will be edited for brevity and clarity. They should be addressed to Jamie Eckle, letters editor, *Computerworld*, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 879-4843. Internet: letters@computerworld.com. Include an address and phone number for immediate verification.



DAVID MOSCHELLA is vice president of knowledge strategy at Meansbusiness, a Boston-based Internet start-up that's building a database of ideas. Contact him at dmoschella@earthlink.net.

Amazon's pricing scheme is nothing unusual

THE NERVE of Amazon, charging different customers different prices for the same product ["Customers Balk at Variable DVD Pricing," News, Sept. 11]. It's shocking, I say, shocking, that Amazon.com would be so dishonest as to base pricing on browser preferences, frequency of purchase or ISP. Are customers also directing their anger against grocery chains, chain stores, gas stations and car dealers?

As long as it isn't a publicly advertised sale item, an item sold by a

grocery chain can have different prices in adjacent postal codes and even in different neighborhoods within the same postal code. Then there are the mailings sent to repeat customers of Company Y. Some customers will get a 15%-off coupon, some 25%, some 10%. The value of the coupon depends on how much they spent with Company Y over the previous x months. Most companies practice variable product pricing; Amazon is no different.

N. Young
Addison, Ill.

Windows 2000 ADVANTAGE

The Web Magazine for IT Leaders Implementing Windows 2000 and Windows NT with Compaq Services and Solutions

Online this week:

POINT OF VIEW

Datacenter Solutions Lab reflects close Compaq-Microsoft relationship

Compaq has demonstrated its commitment to Microsoft Windows 2000 Datacenter with its Datacenter Solutions Lab, which will be staffed by Compaq and Microsoft personnel and located close the Microsoft campus. www.windows2000advantage.com/pov/09-11-00_datacenter.asp/300

TECH EDGE

XML's critical role in the .NET Framework

This articles show a technical snapshot of XML in the Microsoft .NET Framework and identifies key product components such as BizTalk 2000 and SQL Server 2000 that encompass the implementation of .NET. www.windows2000advantage.com/tech_edge/09-04-00_xml.asp/300

Q & A

Microsoft's Bruce Olson: Working with Compaq on Microsoft Windows 2000 Datacenter Server

As account manager - Enterprise Servers for U.S.-OEM Multinational Accounts, Bruce Olson focuses primarily on the relationship between Microsoft and Compaq. www.windows2000advantage.com/qa/09-04-00_olson.asp/300

COLUMNS

Ready, Set, Migrate! Let the 2000 Games Begin

Olivier J. Thierry believes there is a parallel between the preparation required to compete in the 2000 Olympic games and the preparation required for the migration and deployment of Microsoft Windows 2000. www.windows2000advantage.com/columns/09-11-00_migrate.asp/300

CASE STUDIES

PRIMUS selects Compaq to launch U.S. data center

PRIMUS Telecommunications Group Inc. selected Compaq to provide a full suite of professional services and an integrated application service provider infrastructure - based on Windows 2000. www.windows2000advantage.com/case_studies/08-14-00_primus.asp/300

COLUMN >

Windows 2000 relationship to Microsoft's .NET initiative

The .NET Framework is based largely on the Next Generation Windows initiative announced earlier this year by Microsoft Chairman Bill Gates. Coming on the heels of the February release of Microsoft Windows 2000, some questions were raised concerning the future role of the new operating system within .NET. Let's preface this article with a clear statement that Windows 2000 is the centerpiece of the .NET initiative. The current .NET beta code is designed to layer within Windows 2000 and to fully utilize the most powerful features.

For the full story, visit: www.windows2000advantage.com/300

CASE STUDY >

Windows 2000 fever can be infectious, just ask Datareturn.com

After thoroughly testing Microsoft Windows 2000 Advanced Server as part of Microsoft's Joint Development Program, Datareturn.com, a Web co-location service, lost no time migrating its own Web site, and customers' shared Web servers. These are the systems over which it has operating system revision control, says Jason Lochhead Datareturn.com's CTO. It's up to the customers, however, when to move their dedicated application servers from Microsoft Windows NT Server 4.0 to Microsoft Windows 2000, Lochhead notes, and some customer are taking their time preparing for the move, he adds.

For the full story, visit: www.windows2000advantage.com/case_studies/09-18-00_infectious.asp/300

MOMENTUM SERIES >

Compaq bolsters commercial desktop line with Deskpro EX

Compaq completed the redesign of its commercial desktop line with the introduction of the Compaq Deskpro EX. Compaq will also expand the Deskpro commercial desktop line and the Armada commercial notebook line to include new Deskpro EXS, Armada E500S and Armada 100S.

For the full story, visit: www.windows2000advantage.com/momentum/09-18-00_deskpro.asp/300

www.Windows2000Advantage.com/300

TECH EDGE >

Two Microsoft packages achieve Unix functionality and interoperability with Windows 2000

As Microsoft Windows 2000 is increasingly deployed, the issue of integration and co-existence with Unix will become increasingly important. Fortunately, Microsoft Windows 2000 already adheres to many standards common to many variants of Unix including Domain Name System (DNS), Dynamic Host Configuration Protocol (DHCP), Lightweight Directory Access Protocol (LDAP) and Kerberos. Third-party software solutions such as Samba can facilitate file system sharing.

For full story, visit: www.windows2000advantage.com/tech_edge/09-18-00_unix.asp/300

2000 GENERATION >

Upgraded SQL Server 2000 facilitates Web-based applications, offers increased reliability and scalability

With the upcoming release of SQL Server 2000, Microsoft has an opportunity to play in the major leagues when it comes to enterprise-grade database servers. The new version – scheduled to ship this fall – has received a series of major improvements in four areas: Web applications, reliability, scalability and data analysis.

For the full story, visit:
www.windows2000advantage.com/2000gen/08-21-00_sql.asp/300

QUOTE OF THE WEEK >

"With Windows 2000 and Compaq ProLiant 8-ways, we can add bigger blocks of processing power, which means we need fewer machines. This in turn has greatly simplified management of server farms."

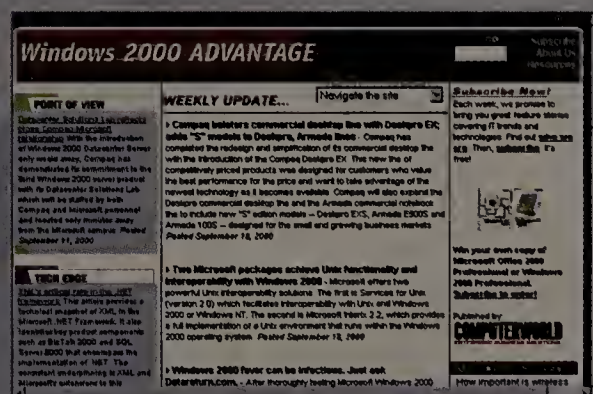
— Jason Lochhead, CTO
Datareturn.com

What is Windows 2000 Advantage?

The editorial mission of Windows 2000 Advantage is to become your primary source of timely, useful information for planning and implementing Microsoft Windows 2000 on Compaq solutions and services.

Windows 2000 Advantage is a Web-only magazine because that lets us bring you, the IT leader, great stories that apply to your day-to-day work. We'll keep you up to date with a weekly e-mail alert so you don't miss a thing.

Windows 2000 Advantage is underwritten by Microsoft and Compaq. Its charter is to address the issues that most concern IT managers charged with keeping their companies on top of the latest and best solutions Microsoft and Compaq have to offer. Toward that goal, we offer a wide range of stories including case studies, columns and news to provide you with information you can't find anywhere else.



www.Windows2000Advantage.com/300

QUICKPOLL >

How important is wireless networking technology to your company over the next two years?

38%
Extremely
important



31%
Somewhat
important

15%
Very
important

16%
Not
important

Cast your vote now at:
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Base: 55 Respondents

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GEOFFREY JAMES

Beware of consultants peddling snake oil

IF LARGE IT projects were sold like snake oil, maybe people wouldn't be so surprised to learn that 40% of them end in utter failure, according to surveys conducted by The Standish Group. Another 33% are "challenged," meaning that they were completed late, over budget or with fewer features and functions than originally specified.

The failure of a large IT project can involve huge cost overruns, drive a company out of business and even (God forbid) get a CIO fired. Many



GEOFFREY JAMES
(www.geoffreyjames.com)
is the author of numerous
books and articles on
high-tech business.

IT executives believe they can prevent such failures by hiring consulting firms to do their development for them. But that can be a really bad idea, because while many IT consultants have high business ethics, some firms are still engaged in business practices that would put a seasoned con man to shame.

One common consulting scam is the "bait and switch." In this game, the

consulting firm sends high-powered partners to make the sale to top management, with the clear implication that these luminaries will be working on the project. But when the project actually begins, it's staffed by MBAs right out of college. This allows the consulting firm to charge big hourly fees to the client while paying its employees entry-level wages.

Another frequently used consulting scam is the "big string-along." This is when the consulting firm encourages the client to keep adding features and functions, so that the project is never completed. Each new feature adds more dollars to the consultant's bottom line because there's very little additional sales cost.

One of the cleverest consulting scams is the "blame the victim" routine. In this scenario, the consultant builds a paper trail (often beginning before the project commences) that documents everything the client did that might lead to project failure. That way, the consultant can turn around and blame the client when the project goes south.

Unscrupulous consultants have numerous ways of covering their tracks. Some ask a client's low-level employee to sign a document saying that a particular piece of software is up and running before it has been adequately tested. That way, if the client ever tries to sue, the consultant

can produce a legal document saying that everything was hunky-dory when delivered.

Like most con artists, consulting firms rely upon the silence of their victims to avoid detection. Let's face it — most IT managers figure it's best to keep their mouths shut and hope for the best when a big IT project goes south. After all, who wants to stand up in front of the board of directors and admit that they invited the foxes into the henhouse?

What's ironic about this is that many IT consultants are completely unaware that they're doing anything unethical. One of the most telling moments in the 1962 Oscar-winning movie *The Music Man* is when archetypal con man Harold Hill is confronted with the fact that he's selling musical instruments even though he has no intention of teaching his would-be students how to use them. Hill, crestfallen, reveals the psychology of a successful con man: "I always believe that there's a band, kid."

In other words, con men, like some consultants, are at their most persuasive when they're believing their own BS. May the client beware. ▀

MICHAEL GARTENBERG

What do you want from the Internet of tomorrow?

IF THE FILM *The Graduate* were being made today, the advice given to Dustin Hoffman wouldn't be "plastics" but rather, "wireless." New cell phones come Internet-equipped and include tiny browsers. The experts are, of course, already speaking of trillion-dollar markets. But is the next-generation Internet the wireless Web? Or is wireless more hype than reality?

The problem is that many within the industry are confusing the next generation of the Internet and the Web as being necessarily wireless in nature. This is a mistake, confusing the transport of information with the actual functionality. Today's Web isn't primarily about transport and wasn't successful because of HTTP or TCP/IP. The key to the success of the Internet of today and tomorrow is the delivery of services and functions.

Future Internet platforms will share little in common with the prevalent platform of today, namely the PC. While the PC will continue to exist as a critical information device for many individuals, many additional devices will supple-



MICHAEL GARTENBERG,
former vice president
and research area direc-
tor at Gartner Group Inc.,
is looking for the next
generation of Internet
technologies. He can be
reached at
michaelg@dellnet.com.

ment it. One of the first will be the cell phone, which is leading the charge that the next iteration of the Internet will be wireless in nature. The truth is that wireless devices are merely the next step in the evolution of the Internet, much as the Web changed the face of the Internet in the early '90s.

The essence of the next generation of the Internet is that it will be very different from today's wired Web. Today's Internet is dominated by the PC platform. That implies high-bandwidth connections, large color screens and complicated operating systems such as Windows and Linux. The devices of the next generation may not share any of these attributes. The result: It will be critical that the applications created for the next generation of the Internet for commercial business use don't merely mimic the existing PC-centric applications of today. Rather, these new applications must either add functions to today's applications or be entirely new in nature and function.

Have you ever tried to use a Web-enabled cell phone to do something as mundane as purchasing a book? It's an overly complicated process that most people won't put up with (except for possibly the technologically infatuated, who will endure the hassle so they can tell people how they ordered a book from their phones). While most people won't want to purchase books or airline tickets from their cell phones, air travelers might be interested in knowing when there is a gate change, or if the flight is delayed or canceled. This is precisely that type of application that extends existing functionality.

But that's only half the story. The next generation of the Web will also enable new types of applications and services that couldn't exist on the current Internet. For example, the ability to have a single device that enables a person to search for an item, compare prices, get directions to the merchant, check inventory and use the device to pay for the item is a reality that's coming soon. But these functions aren't limited to wireless devices and cell phones. The wireless connection will open the door to a whole new class of devices that will enable new types of commerce, communication and connectivity.

IT departments need to spend time now looking at new devices and how they can and will be implemented and deployed. Existing applications need to be reviewed for how they will be presented on next-generation devices both in terms of display and business logic. The key is to focus on the functionality and not just the transport.

What are you doing to prepare for the next generation? ▀

The Web of today and tomorrow is about more than just wireless.



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up 27% of your time.

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network
adapters
help
take it
back.

intel.

simplify LAN maintenance with intel® pro/100 network adapters. with singledriver technology, you can install and maintain your network connections using just one cd. one solution from top to bottom. from pcs to servers to notebooks. the result: valuable time and money saved. this is just one of the many new ways intel adapters are solving problems you never thought adapters could solve. make sure you specify intel adapters. because in the surge economy, lost minutes take months to make up for. (intelligent way to connect → intel.com/go/singledriver)



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COMPANY
WITH NO
ROOM FOR
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READERS' LETTERS

Sun's 'standard practice' of nondisclosure doesn't make sense

IN THE LETTER "Standard Practice" [Readers' Letters, Sept. 11], *Computerworld* was attacked for reporting Sun's practice of secrecy and denial concerning memory problems in its high-end servers.

Computerworld was absolutely correct to report the problem. If the report put Sun in a bad light, it was Sun that is responsible. Nondisclosure agreements would make sense if a vendor was working closely with a customer on improvements to a proprietary design. This was not the case. Sun was trying to conceal an ongoing problem.

Computerworld's readers are IT managers who need to know if they can trust a vendor during and after a purchase. If Sun's support policy includes denial and concealment, *Computerworld* readers need to know that.

I commend both the reporter and the editors for a job well done.

John Pittaway

IT consultant
Santa Ana, Calif.
jpittawa@pacbell.net

IWORK FOR ONE of the U.K.'s largest IT services companies, where we run all levels of Enterprise servers. In the last 12 months, we've had serious problems with E10ks, E6ks and E4ks on services we run for external customers. The problems got so bad on the E6500-based service that our customer was close to terminating the contract.

I ran the implementation of the service based on the E10ks and was singularly unimpressed with Sun (U.K.)'s customer services and professional services teams. I strongly felt their en-

gagement with us was driven more by the desire to protect themselves from any issues on our implementation rather than actually helping us deploy our system/application. Even after we read your article on the cache problem ["More Users Slam Sun for Memory Issue," Page One, Sept. 4], our Sun-Service manager still claimed ignorance of the issue; maybe the non-disclosure agreement applied internally also.

My experience with Sun was in stark contrast to that with Sequent, with which we had worked for most of 1999 to deliver a major infrastructure upgrade on another major U.K.-wide IT project. I couldn't speak highly enough of the guys with whom we worked there. Today, my preference would be to deploy Sequent/IBM NUMA-Qs.

Don Thompson

Belfast, Northern Ireland

Living in a state of denial

THE ARTICLE "Gimme Some Respect!" [Business, Sept. 4] got me thinking about training. The state of Alaska, for which I work, is nervous about providing training, for fear that it only increases the disparity between an employee's state salary and potential private industry salary. To solve this problem, my division instituted a policy that requires any IT employee who receives at least \$501 worth of training to commit to two years of additional state employment, or else reimburse the state for the training expense. That's two or three days' salary.

What a Dilbertesque solution. Does this make me an indentured servant for the state?

David Grove

Department of Health and Social Services
Juneau, Alaska

him to work hard and learn on the job fast. The government may increase the H-1B cap to any level, but it will never be sufficient as long as the driving factor is cheaper labor and there is wage disparity between the U.S. and other countries.

Arawat Singh

Norcross, Ga.
arawat@juno.com

QUEST SYSTEMS Inc. President Dave Samuelson's thinking on H-1B visas is wrong ["Trade Group Urges More H-1B Visas," *Computerworld.com*, Sept. 6]. I have a BSCS and 10 years in C, Unix, Oracle and SAP, yet even though I've taken Java classes, I can't get any response from companies posting developer jobs in the San Francisco area. The bottom line is that the supposed need for H-1B developers is baloney. It's time to put the brakes on this runaway train.

Rob Stuehler

SAP developer
San Francisco
rasf@pgc.com

Easy to fall behind on the buzz

IT WAS REFRESHING to read "Lose the Buzzwords" [News Opinion, Sept. 11]. I've been working for less than two years as a programmer/software developer, and I already feel outnumbered by people who are addicted to buzzwords and saying them as fast as they can. I guess that makes them more successful.

Brad Kilman

Software developer
BMK Inc.
Oklahoma City
bkilman@jacksmerch.com

Recording industry should embrace technology's potential

THE RECORDING Industry Association of America is being shortsighted ["Recording Industry Group Urges Court to Uphold Napster Ruling," *Computerworld.com*, Sept. 11]. It maintains that Napster's technology hurts recording artists, but it also provides them a wealth of opportunities to reach more potential customers at lower cost.

The technology to capture copyrighted material won't go away, and copy-protection schemes are usually defeated long before the cost of developing them is recovered. The RIAA needs to embrace the technological revolution that is upon it if it wants to realize the benefits it can provide.

C. Marc Wagner

Services development specialist
Indiana University
Bloomington

Reasons for raising H-1B visa cap need to be rethought

NORM MATLOFF'S argument that the H-1B cap shouldn't be raised because "insincere employers use the shortage of program-specific experience as an excuse to hire foreign workers who are less expensive" is only partly correct ["Should the H-1B Cap Be Raised?" Special Report, Aug. 28]. Cheap labor is just one aspect of it. The main problem is that employers reject 98% of local applicants for programming jobs without realizing that any competent programmer can pick up a new programming language quickly. In some cases, the overseas programmer has undergone only short training in a private training shop, and his experience is just on paper. Once the programmer is in the U.S., basic insecurity drives

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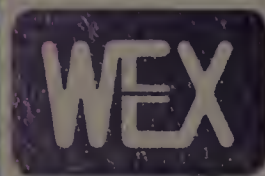
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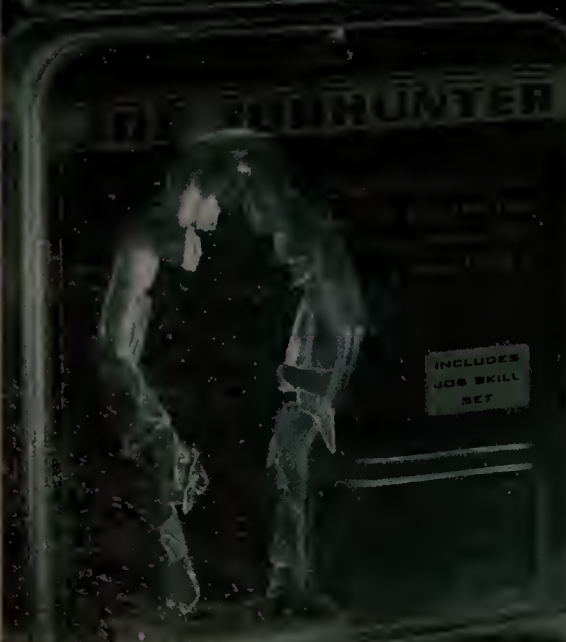
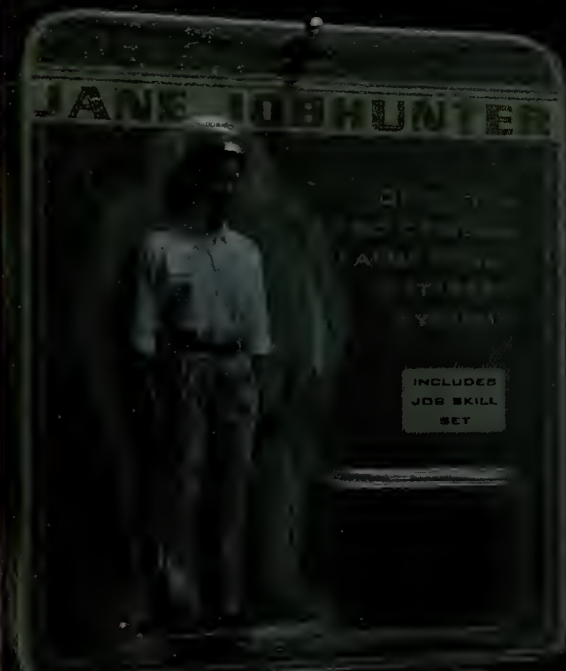


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BUSINESS

OH, THE HUMANITY!

When devising business-continuity plans, companies take steps to make sure systems and operations can continue with little or no interruption. The one piece often missing from such plans is the human factor — how to meet the needs of employees and their families so they're around to keep things going in the event of a disaster. **► 48**

WHY WIRELESS?

Handhelds are cool, writes Kevin Fogarty, but flexible, broadband networking is the real steak in the sizzle about wireless technology. The problem is, vendors have yet to figure that out. **► 48**

SPECIAL EFFECTS

At Cinesite's digital effects studio, tracking help desk queries has been nothing short of a nightmare. So the company is shifting from its old paper-based system to a new wireless-accessible workflow software package. It's an idea that's catching on among companies, but wireless workflow systems are still in their infancy, say analysts. **► 52**

HUMAN SUPPLY CHAIN

For years, manufacturers have relied on supply-chain management to track their merchandise. Now, service companies are following their lead as they turn to automated systems to

help track intellectual capital and the status of projects. **► 54**

THE FUTURE IT SHOP

Finally getting used to your Gen X colleagues? Well, make way for the Millennial Generation — the next wave of employees expected to swarm into the labor market in the next five years. Futurists say this new workforce will bring vast changes to the workplace. Among them, an end to the worker shortage, more non-IT-trained workers in IT jobs and lower salaries. **► 57**

SECURITY SQUEEZE

Hiring is tough for everyone, but trying to land a qualified information security executive can seem impossible. Certified security chiefs are in short supply and are choosy about their options. Find out what they're looking for in their next jobs. **► 62**

CHANNEL CONFLICT

Stores, telemarketers, Web sites, catalogs. The channels for selling goods are increasing, but rather than boosting productivity and sales, companies often find that their divisions are in conflict. But, experts say, channels can complement each other if managed correctly. **► 80**

MORE

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Opinion: Jim Champy 56



C. WILLIAM MCCURDY, associate director for computing sciences at Ernest Orlando Lawrence Berkeley National Laboratory, has been looking for a CIO for six months. "It's driving us nuts," he says

IN SEARCH OF THE RIGHT CIO

THE STAKES ARE HIGH in any CIO search. Companies want to find people with the right balance of technical skills and business instincts. But for highly specialized, complex fields such as science or health care, it's just as critical to find people with industry expertise. The problem is, there aren't many of them out there.

68

Guarding Staffers From Nature's Worst

Taking care of employees is as critical to business continuity as protecting systems

BY KATHLEEN OHLSON

When Mother Nature unleashed her wrath during Presidents Day weekend this past February, an ice storm paralyzed the Southeastern U.S., damaging homes, blowing out electricity lines and turning streets into skating rinks.

At CheckFree Corp., an electronic payment service based in Norcross, Ga., 20 key information technology employees worked around the clock to ensure that the company's systems didn't go down during the storm. As part of its contingency plan, CheckFree housed staffers and their families in its campus hotel.

"[Employees] are the key resource that keeps companies in business," said Brian MacKay, senior business continuity coordinator at CheckFree. "If employees know there's a safety net for them and their families, they won't hesitate to do the job."

As CheckFree and other companies protect themselves against wildfires raging through the Western U.S. or hurricanes in coastal areas, they're also paying close attention to employees' needs as part of their disaster-recovery plans. Otherwise, there would be nobody around to flip a server switch back on.

"Companies have traditionally focused on the technology, not the employee," said Linda Cerni, a disaster-services product manager at Comdisco Inc., a continuity services vendor in Rosemont, Ill. But companies are starting to realize that "if they don't support employees, there's no point saving the data at a hot site, because no one will show up."

Companies that wait until after a disaster hits before addressing employee needs may find that it's too late, said Philip Jan Rothstein, president of Rothstein Associates Inc., a disaster-recovery consultancy in Brookfield, Conn. For example, a financial services firm he worked with failed to address transportation for its employees in its business contingency

plans. When a hurricane hit five years ago, employees couldn't get to the data center, and it took two days for the business to restart.

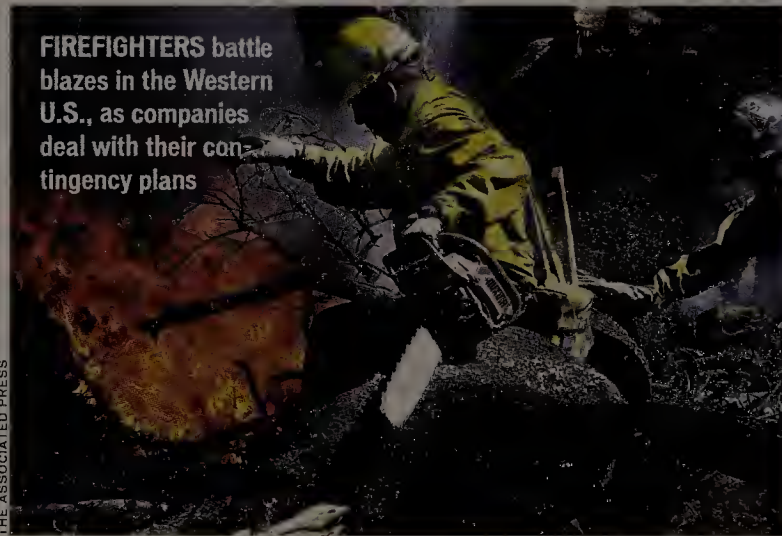
"Most organizations don't invest enough time before a crisis to see if a plan works," said Rothstein. "If it doesn't happen in the beginning, lots slip through the cracks."

Attention to Detail

When two tornadoes ripped through Fort Worth, Texas, in March, the windows at Union Pacific Resources Group Inc.'s (UPR) corporate headquarters were shattered by flying debris, destroying its data center.

Fortunately, UPR (which was bought the following month by Houston-based Anadarko Petroleum Corp.) already had a contract with Comdisco to rebuild its computer center and offer business support in case of a disaster.

FIREFIGHTERS battle blazes in the Western U.S., as companies deal with their contingency plans



KEVIN FOGARTY/BRICKS AND CLICKS Missing the picture

YOU'D THINK that with all the ink we've spilled writing about wireless technologies, we'd have gotten to what's important by now.

That happens sometimes in the news business, as the pack follows some flash in the pan that seems to be news but is really just a symptom of a larger story that's undercovered. Monicagate wasn't about an intern, after all; it was about hardball politics that affected every action of both the White House and Congress. But the pack followed the obvious, lurid details, not the background story.

I realized that the press is undercovering the background story on wireless technology a few weeks ago at a conference where I moderated a session on "Managing Mobile Workers."

The sponsoring vendor and conference organizers wanted us to talk about how

to support major-league applications on handhelds and smart phones and ways to enable nonmobile workers to become mobile. They wanted the same sexy, gadget-focused story *Computerworld* and other publications have been writing for the past year.

But the users at the session didn't want to talk about that. They didn't trust handhelds. They loved the convenience of wireless technology but didn't think it would have any impact on their core applications in the next two years.

Most of them recognized that they would have to adapt to the consumer-driven trend toward mobile computing enough to support PDAs internally and

probably create a mobile/smart-phone channel for their Web sites. That's not really a big deal.

But creating a way to give employees access to mission-critical applications from the road is a scary, complex thing. Two-thirds of the IT users that *Computerworld* polled for a July 31 story said they planned to support wireless technology in the future, but half also said security and reliability would be a serious problem.

My session members agreed. They couldn't see how they could build access to core applications for devices that lack firewall clients and encryption, and that drop information if the batteries fall out or distribute it to the public if the owner leaves it in an airport. They said the real priority

just four weeks, the company was able to temporarily set up shop at Comdisco's technology service center in Grand Rapids, Texas, rather than move its entire data center staff to New Jersey.

"But if there was widespread damage, it would be hard to convince anyone to leave for New Jersey if they were hit by a tornado," said Coates. "Employees want to know their personal lives are taken care of and they're not at the mercy of Mother Nature."

Practical Steps

Just as companies need to think about the physical needs of employees, they must also provide counseling services, said Gaeron Caldwell, president of Axxess Disaster Consulting Group in West Vancouver, British Columbia.

Cindy Custer was one of thousands of citizens who rode
Disasters, page 54

isn't connecting Jill Salesperson to her contact database; it's connecting the Wichita office to the VPN.

Wireless is moving rapidly in that direction. Despite the high-profile demise of the Iridium network, satellite data connections are becoming an affordable way to connect remote offices.

Broadband wireless is also developing so fast that it may overtake DSL and ISDN as the best way to cover the last mile between a telco and a branch office. And

wireless LANs will reach 22M bit/sec. within the next year or so, eliminating much of the need to change wiring and a lot of the crawl-under-the-desk support that sucks up so many IT resources now.

That's where wireless can really deliver. That's

the thing about wireless that's truly important to IT.

Yes, handhelds are cool. But when wireless really arrives, PDAs and wireless e-mail are the least of what IT can expect from it. ▀



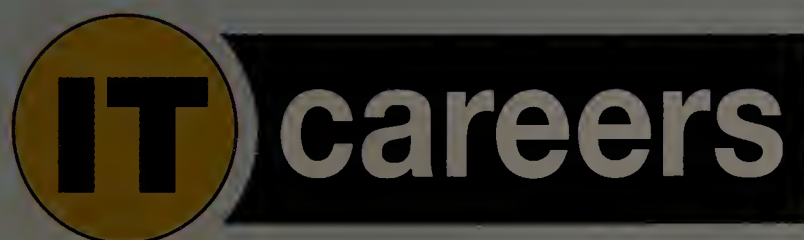
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Wireless Workflow Apps Gain in Popularity

BY MATT HAMBLIN

At Cinesite Inc., a digital special-effects studio in Hollywood, artists pore over computer displays, banging out images for upcoming film hits using a variety of desktop platforms and programs.

The rigors of 200 artists creating digital images for films like X-Men put tremendous demands on the company's information systems and help desk.

To adjust, the studio is installing a wireless workflow software package to replace its old paper-based system for tracking trouble reports from employees and planning new systems installations, according to Philip Rowe, senior systems administrator at Cinesite.

"What we've had until now is basically a clipboard list of information and people stopping you in the hall to ask what's going on with a system," he said with a laugh.

"Help desk jobs were not getting done, and we'd lost track of work issues, and there were problems with response,"

Rowe added. "Nobody would know the status of a project, or the person who did know would be out sick."

Wireless connections to workflow software products are gaining popularity, as they help workers move and file reports such as help desk requests and responses, analysts said.

"Wireless applications will give a shot in the arm to workflow vendors just because of the gains from wireless productivity," said analyst Nathaniel Palmer at Delphi Group Ltd. in Boston.

Cinesite's staffers initially will input help desk records on Palm VII devices that are tied to computers with a synchronization cradle. But eventually, they will be able to work wirelessly from any location, even from home.

Cinesite bought three products from TeamShare Inc. in Colorado

Springs to create the workflow automation and allow access to the data from PalmPilots. Pricing starts at \$840 per user for

all three products, according to TeamShare. TeamShare's wireless mobile functionality was added in July with synchronization help from Aether Systems Inc. in Owings Mills, Md.

Many companies use wireless LANs for workers to up-

date work processes, but wireless access over a wide-area network is "still very early," said Phillip Redman, an analyst at Gartner Group Inc. in Stamford, Conn.

However, not all companies find wireless connections necessary. "Some workers,

like insurance auditors, can work in untethered mode, so they don't need to pay the premium cost for a wireless network," said Shawn O'Donnell, president of GlobalTech Source Inc. in Melbourne Beach, Fla. O'Donnell's company provides Windows CE-based handhelds with keyboards to insurance auditors.

When auditors are on the road, they use handhelds equipped with preset forms from Ottawa-based JetForm Corp. and make a toll-free dial-up connection to GlobalTech's portal to transmit the forms to the network.

But, O'Donnell said, "I can see where a delivery person or many others would want a wireless connection." ▀



PHILIP ROWE, senior systems administrator at digital special-effects studio Cinesite, says the company is installing wireless workflow to aid in help desk requests

PIMM FOX/VOICE FROM THE VALLEY

Novell's tragic tale

BLAME SOMEBODY. Anybody. Everybody. But the saga of Novell is almost too sad for words.

Once the world's leading vendor of networking software, the Provo, Utah-based firm is struggling with competition from Microsoft as well as the explosive growth of Internet networking strategies that threaten to make NetWare a legacy of another era.

Sales of NetWare fell short of expectations (third-quarter revenue was down 17% year over year), partly because of Microsoft's introduction of Windows 2000 but also because of Novell's change in strategy.

The company is trying to address shifts in e-commerce as well as introduce new caching software, but in the meantime, operating

margins are falling. Wall Street has taken only slight comfort from Novell's announcement earlier this month that it would lay off about 900 employees in an effort to cut costs.

Is that enough?

"Look, in the beginning there were no networks; people operated computers pretty much stand-alone," says Philip Sih, an information technology strategy and architecture consultant at Cupertino, Calif.-based DBC Associates.

"When you had more than one computer, people thought connecting them

might be a good idea, and they used stuff like SNA, RJE, MRJE and HASP to do it if they had IBM machines," he adds.

Indeed, in the pre-Novell world, "you had to be an academic institution with bunches of grad students to keep your network running," says Sih. "After 1980 and the PC, everyone wanted to be networked. Now, networking is generic. It's like having a remote control for your television."

The secular decline of NetWare and its loss of market share is an example of what happens when your business becomes generic.

Indeed, says Jonathan Hoopes, an analyst at Paine-Webber, "without traction in Novell's new line of directory-enabled applications,

we are inclined to lower our sum-of-the-parts valuation. Aside from a buyout, we do not expect any catalysts for significant upside until the first quarter of next year, where we should have a better understanding of where the new business prospects are heading."

The Internet and computer networks headed in one direction and Novell stood still, clinging to its proprietary network. So the one problem looming ahead for Novell — like a 10-ton truck — was the turn from proprietary branded networks to ones that came bundled with a whole host of applications and services.

A strong balance sheet with \$677 million in cash and cash equivalents means the company won't be on

the rocks anytime soon. But can investor and vendor patience continue?

"We believe this whole issue is still a work in progress at best," says Martin Pyykkonen, an analyst at CIBC World Markets Equity Research.

The path of Novell is a reminder of how "risk-aware" corporate decision-makers and investors have become.

"Professionals do not want to be led down a blind alley where they have to rely on one vendor," Sih says.

"They don't want to be locked into higher costs. We want wide product choices, support and competitive pricing. Networking capabilities are a commodity now. We don't buy brands; we buy solutions to real problems." ▀



PIMM FOX IS Computerworld's West Coast bureau chief. Contact him at pimm.fox@computerworld.com.

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Service Firms Track Staff, Projects Using Automation

BY MARC L. SONGINI

Service-based companies are starting to turn to automation to boost efficiency and profitability, just as manufacturers have done with supply-chain management products.

Professional services automation (PSA) software can help companies keep track of their staff, projects and bid turnaround times in days or weeks instead of months, giving them the upper hand with competitors, said David Hofferberth, an analyst at Aberdeen Group Inc. in Boston.

The PSA software market is growing: Hofferberth projects that businesses will spend \$264 million in PSA software license fees this year, and as

much as \$1.3 billion in 2003.

Most service companies have already automated some of their business processes but in only a piecemeal way, said Marilyn Muller, an analyst at Summit Strategies Inc., a consulting firm in Boston.

Shearman & Sterling, a global law firm in New York, is installing an eNiku Java-based PSA application to connect lawyers and offices in 15 locations worldwide with one workflow program. The application is made by Niku Corp. in Redwood City, Calif.

Shearman CIO Eugene Stein said he hopes eNiku will help the firm connect billing, marketing, contact management and time and expense process-

es in one system. Previously, Shearman used a hodgepodge of proprietary and off-the-shelf applications running on a 2,400-user Novell, Windows NT, AIX and Solaris server network. It was a "nightmare" to update and coordinate, Stein said.

"The No. 1 reason for resources management is knowing what [service companies] have, what skills and qualifications, along with their availability and billing rates," said Ted Kempf, a senior analyst at Gartner Group Inc. in Mountain View, Calif.

On the downside, integrating PSA software into a legacy information technology infrastructure can be a struggle, said Kempf.

It's crucial that PSA software be Web-based for mobile access, said Anthony Brady, vice president of e-commerce product development at Mellon Global Cash Management Inc. in Pittsburgh. ■

Continued from page 48

Disasters

out the Red River floods in April 1997, when 108 feet of snow melted, causing the river to crest to 60 feet. The normal flood stage is 28 feet.

"It was an emotional time for most people, and we're a huge corporation, and we reaped the benefits of that," said Custer, an information systems support manager at a Grand Forks, N.D., facility owned by Ecolab Inc., a cleaning and sanitizing company. Allan Schuman, Ecolab's CIO, told employees they would still be paid, and "he stuck by that," Custer said.

St. Paul, Minn.-based Ecolab also set up a catastrophe fund and sent teams to clean employees' destroyed homes.

Other plans should include a toll-free emergency number for employees and their fami-

lies, contact information for the local American Red Cross chapter, shelter provisions for employees and their families and frequent updates about the status of the disaster recovery.

CheckFree's MacKay said companies need to have the right people brought in before a crisis to plan who will perform certain tasks if an emergency hits.

"If [employees] have to choose, they'll take care of their family, and work comes second. You don't have the luxury of getting more people when a crisis hits," he said.

But the key is to be ready, said Darren Irby, a spokesman at Washington-based American Red Cross.

"People see a disaster on TV and say, 'Thank gosh I'm in North Carolina and the fires are in Montana,'" Irby said. "You realize at some point it will happen to you. We're all vulnerable." ■



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WORKSTYLES

What It's Like to Work at . . . The Limited Inc.

Interviewee: Rodney Fleming, advanced technology consultant (a research and development position)

Company: Limited Technology Services (LTS), the information technology arm and wholly owned subsidiary of The Limited Inc., whose stores include The Limited, Express, Victoria's Secret, Lane Bryant and others.

Main location: Columbus, Ohio

Number of IT employees: About 700 companywide in six U.S. locations and Hong Kong; 40 in the advanced technology group

Number of employees (end users): About 13,000

Workday: "Typically, it's eight hours; a really long day would be about 12 hours, but I've been here all night before. Even when I go home, I'm still on the computer each night."

Why does what you do change so much from day to day? "We're trying to go to a more centralized model. Typically, the IT departments here were segmented by the different Limited companies, and each department was making decisions based on what was good for that brand."

"With the formation of LTS, we started trying to corral all those strategies into one, and our immediate goal is to find solutions for all of our applications development that are generic enough to fit the structure of all these different companies."

"All the business models are somewhat different, so we want to find a suite of tools that we can use across each brand."

Major IT initiatives: "Lately, the biggest thing is our intranet and Internet architecture schemes, because we're trying to go to a more centralized blueprint. Our intranet is about 8 months old, formally, as we're trying to take it to the next level [and] give it more features that we can leverage across the company."

What impact does the back-to-school shopping season have on IT for a retailer?

"It's not as big of a deal for us in comparison to Christmas, Valentine's Day and Mother's Day."

IT training: "We don't have a

real formal training agenda on our [advanced technology research] team. We're always looking at something new, so training is an everyday occurrence. I may know nothing on a topic on Monday, and by Friday I've digested eight books on the subject. The only thing that's formally slated is more advanced Java training, and maybe Linux certification once that's more settled in the Linux community."

IT bonus programs: Y2k bonuses were as much as 20% of annual salary, and spot bonuses are given for outstanding performance.

The one thing everyone complains about: "Lately, the transition from being small and decentralized to being a large, centralized group. LTS is only about a year old. Everyone's role has changed, and people are always apprehensive about that."

Favorite project: The Victoria's Secret online runway show. "I was involved in finding those initial technologies and working on the demo and prototype of the streaming technology for our first webcast in 1998, the year we broke the Internet. [Last year], we were doing actual e-commerce during the streaming media show, and it came off pretty much without a hitch. I prototyped that and developed the architecture."

Percentage of staff that telecommutes: Last month, the company announced a formal telecommuting and flexible scheduling policy for all IT employees.

Little perks: A 40% discount on the company's products; a \$3,000 employee-referral bonus program; thank-you notes with movie tickets or restaurant certificates enclosed that managers can give out randomly; up to \$1,000 per year in gift certificates to CompUSA Inc. stores for home technology purchases.

"All the individual groups in IT meet up and do things together, like the Victoria's Secret guys got together for a cookout and golfing. My team goes out together a lot after work."

— Leslie Goff

lgoff@ix.netcom.com

JIM CHAMPY

Blending old, new

THERE'S A NAIVE but seductive proposition making the rounds: If you're a brick-and-mortar company and want to move into the digital world, start a "newco" (or new company). In other words, launch a new enterprise with a structure and culture independent of — and different from — the existing company. It usually involves a mix of new hires and existing staff and a different way of doing business.

But it usually doesn't work.

The assumption underlying the creation of newcos is that the cultures of brick-and-mortar companies won't support new business models, such as digital marketplaces. The cultures of so-called old-economy companies are seen as slow, bureaucratic and risk-averse compared with the cultures of New Economy companies, where the watchwords are *fast, just do it* and *24/7*.

Newcos have also looked attractive because until recently, Wall Street paid a high price for anything digital. So executives saw them as a way to create more shareholder value.

The creation of Barnesandnoble.com is one of the more notable examples of the newco approach and some of its failings. No business can just be a hollow shell once it creates a newco. The fact is, most existing businesses have much to contribute to a new enterprise. If you want to abandon your current business in favor of a newco, you had better plan the former's demise carefully. A sudden parental disappearance can spell doom for a fledgling enterprise.

But creating a newco and ignoring an older business denies at least two realities. A new business requires more than an exciting Web site. It must be linked to the physical world and to legacy systems. This is true even if you're a dot-com start-up selling knowledge or providing entertainment. Information and music have to come from somewhere. And if you're selling a product over the Internet, you must be linked to someone's supply chain.

But creating linkages to the physical world is a challenge. So many companies and IT services organizations choose to focus on only the customer-facing aspects of a newco. The results are businesses that don't work and products that don't get delivered.

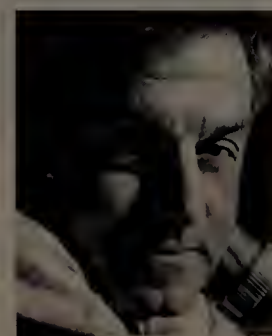
It's also important to recognize that in existing companies, the current business pays the

bills. Profits from the old build the new. The people and customers of an ongoing business require care. If managers pay attention to only the more seductive start-ups, they may lose the assets they need to succeed.

Creating a new business out of an old one is certainly challenging, but here are a few pointers to get you started.

Begin by considering the character of the new business you want to create. What is its distinctive product or service? What assets will be required, both intellectual and physical, to deliver that product or service? What customer segment does the new business target? What geography will you serve? The Internet allows you to cover the world, but you may not have the capabilities to do so.

Creating a new business out of an old one is certainly challenging, but here are a few pointers.



Next, look at your current business and consider what aspects are valuable and possibly already distinctive. What do you want to preserve, both physically and culturally. Companies like General Electric do this exceptionally well. The new businesses GE creates or buys are almost always based on its industry knowledge and often use pieces of existing infrastructure.

The challenge, of course, is always to figure out how to get from the past to the future. Your success will be based on your ability to execute and link your legacy systems with your new face to customers. Don't try to replace or reconfigure all of your old systems. You probably won't have the resources or time to rebuild everything.

Newcos don't come out of nothing. Shape them from the past and for the future. And, while you're doing this, constantly acknowl-

edge the people who have built the business up to now. You need some of them — and you certainly need their profits. ▀

Champy is chairman of consulting at Perot Systems Corp. in Cambridge, Mass. He can be reached at JimChampy@ps.net.

Darker Days Ahead

The good life of IT is about to change – dramatically – with tough times ahead predicted for those who can't evolve into a new breed of business technologist. By Gary H. Anthes

ALL IN ALL, it's going to be a tough world for information technology people, according to a panel of futurists and IT managers who think about the hereafter. The new IT workplace will be shaped not so much by changes in technology as by changing demographics. A tidal wave of very young workers — many of them from outside the U.S. — will sweep away traditional notions of education, job satisfaction, compensation and loyalty.

"The key population will be the Millennial Generation — people born after 1982," says Atul Dighe, senior futurist at the Institute for Alternative Futures in Alexandria, Va. Those people — who are high school seniors now — will be technically savvy and team-oriented, Dighe says.

AT A GLANCE

- The shortage of IT workers in the U.S. will vanish within five years.
- There will be a glut of programmers.
- Salaries will fall, perhaps sharply.
- Savvy IT workers will compensate by developing non-IT skills — or they will join the ranks of the digital proletariat.
- Meanwhile, IT shops in Fortune 500 companies will remake their cultures and retool their employee relations — or they will die.
- Even the high-tech start-ups will have to mutate if they are to survive.

The IT worker shortage will shrink as the Millennial Generation workers hit the labor force, Dighe predicts. They will be a competitive threat to entrenched IT workers by virtue of their numbers alone. There are more of these children of baby boomers than there are baby boomers themselves.

Meanwhile, Dighe says, a substantial number of aging baby boomers looking for second or third careers will also join the IT labor force.

The 1980s saw the emergence of the college dropout as an important contributor to the IT workforce, Dighe notes, and during the 1990s, high school dropouts began taking IT jobs. "I wonder if

the next killer app will come from an elementary-school dropout," he says with a laugh.

Indeed, universities offering expensive, lengthy degree programs are "atrophying as we speak," says corporate futurist Thornton May, an occasional *Computerworld* columnist and chief awareness officer at Guardent Inc., an information security firm in Waltham, Mass. "What am I going to learn at MIT that I'm not going to learn at Akamai [Technologies Inc.]?"

"Octogenarians will be on project teams with teens," May predicts, a phenomenon he calls "Gerber meets Viagra." The groups will require different

Darker Days, page 58



Darker Days Ahead

Continued from page 57

management styles. "The 18-year-old wants to be in the network, learning and contributing. The 60-year-old wants to be recognized for the contributions and play more of an advisory-and-mentor role," he says.

IT professionals will become "contingent workers" who will be brought in to work on a project or to deliver a specific product, Dighe says. Employees will enjoy unprecedented freedom to pursue their own interests, and employers will benefit because it will be easier to vary the size and composition of the workforce, he says.

Any losers? "If you are not very good, there aren't many places to hide," Dighe says.

Minority groups lagging in IT education and training today — such as blacks and immigrants — will fall still further behind, says Joe Coates, president of Coates & Jarratt Inc. in Washington. Companies will need to tap into this potentially rich but poorly trained talent pool, and the way to do that will be to establish cross-cultural training programs, he says.

Non-IT skills will distinguish the most sought-after IT people, says Arnold Brown, chairman of Weiner, Edrich, Brown Inc. in New York. "Employers will start with the premise that everyone knows the computer," he says. "What you have to know to make you stand out from the crowd is people skills — how to motivate people, resolve disputes, communicate."

As companies move into the future, they should look to their pasts, says Charlie Feld, CEO of The Feld Group in Irving, Texas. "The new Fortune 500 will be companies that rebuild their cultures," says Feld, formerly CIO at Atlanta-based Delta Air Lines Inc. and Plano, Texas-based Frito-Lay Inc.

"When I started with IBM [in 1966], I had a very strong indoctrination into the values of IBM — what the customer meant, how we'd treat each other, a sense that my work meant something," Feld says. "By the time I left, 400,000 people later, it was like, 'Who cares?'"

Feld says the IT shops in many large companies are stultifying places populated by demoralized people. They are companies that have lost the pride and spirit they had when they began.

"When I go into a troubled IT shop, I assume everyone there is good but has been poorly led," Feld says. "There's no shortage of IT workers, there's a shortage of IT leadership."

And the shortage of inspired — and inspiring — leadership leads to a sort of malaise, Feld says. "IT folks tend to be pessimistic. But if they are going to change the world in this New Economy, they are going to have go back to a spirit of manifest destiny. That's what the start-ups have — optimism almost to a fault," he says.

Human resources departments will fade away, May predicts, because they tend to be overly rigid in rapidly changing environments. "Their rules not only take a long time to comply with, they are actually toxic," he says. Smart IT managers will be their own human resources managers, he says.

Successful IT shops will "celebrate" the contributions of their employees, May says. The common failure to do that is one of the drivers of the open-source movement, where developers get tremendous satisfaction from the applause of colleagues and users. "It's a huge meritocracy, and the reason people play is to score points," he says.

Compensation will be defined more broadly to include nonfinancial items, such as the opportunity to work on exciting projects with like-minded teammates, Dighe says. Strictly financial rewards will increasingly go to those people willing to do less attractive work, and maybe that's what the retrained baby boomers will do, Dighe speculates.

A Surplus of Labor

There is a "dark cloud" hanging over this shift from paying people for time and place to paying them by task, Coates says. "We have no good data on the price elasticity of demand for white-collar workers. What if there is a 4% labor surplus in your community, and people start bidding down for the job? A small labor surplus could send the whole wage structure plummeting."

And there will be a surplus of IT workers in the U.S. within five years, Coates says.

"Software [development] is being exported so fast from the U.S. that this shortage can't be anything other than ephemeral," Coates says. Those who argue that less-developed countries will never be able to match the software skills found in the U.S. "are just whistling Dixie," he says.

"Software is actually a labor-intensive, not a technology-intensive, enterprise," Coates says. "You have all these educated

but underemployed people in India and Central Europe. Each time they undertake a software job they are building sophistication for the next, more elaborate job. So nothing is going to elude them. In America, there will be a lot of disappointed people when the job they were getting \$50,000 for can be done in India for \$28,000."

Indeed, May predicts, large U.S. companies will recruit much more aggressively overseas and will establish IT schools in less-developed countries.

"The objective will be to extract from these 'colonies' not mineral resources but cerebral raw materials," May says. ▀

MORE THIS ISSUE

Smart employers will increasingly hire nontechnologists for IT roles and retrain them, see page 106.

Octogenarians will be on project teams with teens — a Gerber meets Viagra kind of thing.

THORNTON MAY,
CHIEF AWARENESS OFFICER,
GUARDENT INC.

TOOLS OF THE FUTURE TRADE

A Man's Car Is His Castle

■ "I see the automobile as a perambulating office," says Joe Coates, president of Coates & Jarratt Inc. in Washington. Cars will be fitted with a pull-out frame on the passenger side that will hold a flat-panel screen and keyboard. Voice input and output will be common.

"This has been so neglected so far, but people [in cars] will be a fair part of the new distributed workforce," Coates says. And there will be software "knowbots," he adds.

For example, "suppose you have a 30-page article and you don't want to read the whole thing. You tell the intelligent agent you want a digest that's 3% of the article, or 8% or 12%. It will produce a reliable summary at that percentage, and the agent will learn your interests," Coates says.

There's No Equipped Place Like Home

■ IT employees will have more advanced IT gear at home than at the office, says Thornton May, chief awareness officer at Guardent Inc. in Waltham, Mass. Employers will offer their ever-growing legions of off-site workers an allowance of, say, \$15,000 to buy their own hardware and software off a menu.

The burden of overcoming the resulting complexity will fall on employees, May says. "Those who can't figure it out will be on the slippery slope to second-class digital citizenship," he says. "If it weren't for open protocols and the Internet, we'd all be screwed."

And even those who can make it all work will face a number of cyberperils. "Security, which is underfunded in the corporate world today, will at least initially be ridiculously neglected in the nomadic, personal technology arena," May says.

Being Good to Your Body

■ Office design will increasingly take into account recent discoveries about human biology, says Arnold Brown, chairman of Weiner, Edrich, Brown Inc. in New York. For example, studies have shown that the brain needs natural light to produce serotonin, a chemical in the brain that aids wakefulness. For that reason, cubicles, which are the typical workspace for programmers now, will see less use, he says.

And stress, the leading cause of on-the-job health problems, could be reduced by giving employees more control over their environments, Brown says. There are hundreds of small things, such as providing windows that can be opened, that would give employees more control and reduce stress, he says.

— Gary H. Anthes



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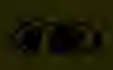
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Finding the right person to oversee an organization's information security efforts can take extra time, money and salesmanship. By Deborah Radcliff

Wanted: SECUR SUPER

WHAT REALLY ATTRACTS Dale Bachman to a company are "cool toys and great projects." Pete van de Gohm looks for work that offers him "brand-new opportunities in brand-new markets." What draws Dan Doherty to a new job is the opportunity for growth and an energized work environment. For Howard Schmidt, the main attractor is support that's "more than lip service" from the top echelons of the corporation.

These employees hold titles such as chief security officer, national security practice manager, corporate security officer and director of information asset protection.

There aren't many such people to go around. One reason is that senior-level security positions like these call for certifications. The de facto security management certification is the Certified Information System Security Professional (CISSP). Only 3,000 have been issued, according to Jim Duffy, president of International Information Systems Security Certifications Consortium Inc. (ISC²) in Framingham, Mass. ISC² is the CISSP certifying body.

In such a tight information technology labor market, it's no small feat to

attract and retain information security executives, according to Tracy Lenzner, president of The Lenzner Group, a Las Vegas recruiting firm that specializes in security. According to a *Computerworld* survey conducted last month that polled 164 IT professionals on their hiring practices, it takes companies an average of three to five months to find and hire senior-level security managers.

And consider this from a recent survey by RHI Consulting Inc., a Menlo Park, Calif.-based IT temporary job placement agency: 58% of 1,400 CIOs polled said they increased their security resources, including personnel, in the past six months.

Companies attracting candidates from this relatively small pool are doing so by giving them what they want. And what they want isn't so much big bucks — although senior-level security professionals can pretty much name their salaries.

For example, when he interviewed Doherty, a retired deputy inspector brigadier general for the U.S. Army, Nick Tanzi, president and chief operating officer at Metromedia Fiber Network Inc. (MFN) in White Plains, N.Y., said he knew from Doherty's questions

that Doherty was looking for growth, challenge and commitment to security objectives.

"In the interview, I was able to demonstrate to [Doherty] that security absolutely meant the difference between success and failure," Tanzi explains. "The other thing Dan focused on was how broad his role would be. I explained to him that security is more than locks on doors, that we knew we needed someone to come in and get our house in order, identify our challenges and address highest priorities first."

Tanzi's honesty about MFN's security issues and needs, along with the opportunity to work in a fast-paced, growing company, are ultimately what reeled Doherty in as chief security officer for the \$75.2 million optical IP backbone company in June.

Such "soft" incentives continue to be the biggest attractors for information security managers, directors and executives, according to the *Computerworld* survey. Respondents listed the biggest attractors as a flexible work en-

PETE VAN DE GOHM at Enron Energy Services says he looks for work that offers him "brand-new opportunities"

Security Can Pay — Handsomely

Information security officers can draw **\$110,000 to \$250,000** in annual salary based on the following factors: company size, company type, location, amount of travel, expertise (e-commerce and business development pay more) and level of ability to lead a security practice.

SOURCE: THE LENZNER GROUP

vironment; growth potential; a progressive, security-conscious environment; and guaranteed support for security from corporate officers.

"The factors I've noticed that matter to senior-level candidates include workplace diversity, exciting technological problems to solve and the connection of their work to the customer," says Doug Merrill, senior vice president of information security at Charles Schwab & Co. in San Francisco.

Who's Interviewing Whom?

Even before senior-level candidates walk through the doors of a potential employer, they're screening for signs of those factors.

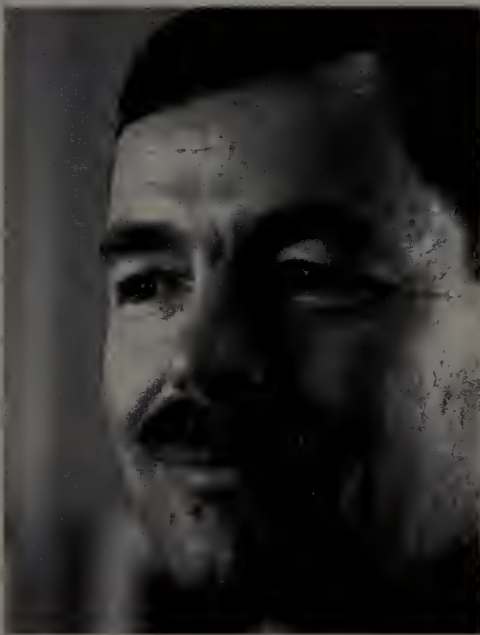
For example, when van de Gohm was leaving the U.S. Air Force security police at the end of 1998, he studied technical crime associations and vertical industries so he could better match his strengths with those industries' particular needs.

So, van de Gohm says, when he interviewed for a security management position at a chip maker in the Southwest, he knew the company's biggest security threat would be chip theft. Since he had a strong background in physical security, he agreed to an interview. But a few days later, he was more intrigued by Houston-based Enron Energy Services Inc.

"This was a brand-new company entering a brand-new market, tied to a brand-new thing [deregulation]. The similarities between the environment here and the environment when I first went to join the Air Force Strike Fighter program were incredible," van de Gohm says. In November 1998, he accepted the job of director of information asset protection at Enron.

Likewise, Doherty's skills in physical and IT security led him to consider the job at MFN after he had been recommended by an employee of MFN's chairman. His research led him to a similar conclusion.

Having recently acquired AboveNet Communications Inc., a Vienna, Va.-based Internet connectivity company, MFN was setting up deals with Dulles,



SCOTT F. KOHN

RITY
MAN

SECURITY SUPERMAN

Va.-based America Online Inc. and San Francisco-based Webvan Group Inc. and was laying fiber-optic cable all over the country.

"I knew there was an opportunity for growth here," says Doherty.

Explains Tanzi, "We're building fiber-optic networks in 67 cities between North America and Europe. The first thing we're concerned with is best practices in physical security, because if someone were to tamper with one of our fiber backbone cables, we'd lose customers and revenue. We also needed someone to be our advocate to legislative and governmental bodies to really understand the new world that we live in and the risks of data theft."

While Tanzi was scoping out Doherty for these qualities, Doherty was checking out the company, especially the employees he saw casually in the hallways and in their cubicles. The employees seemed genuinely excited about their work, he says, which was enough to finally sway him to take the job at MFN, instead of a post at one of the two defense contractors that were also interviewing him.

Schmidt, corporate security officer at Microsoft Corp., says he likes to interview the interviewer. When he interviewed at Microsoft, he says, he was particularly interested in support from above.

"I asked [the CIO and the security team]: 'Who does this position report to? What executive sponsorship exists? What's the escalation procedure if things don't get done? What's the po-

tential for hiring?' " says Schmidt, who was recruited out of the Air Force's Office of Special Investigations, where he directed the computer crime and information warfare training programs, among others.

Top-Down Buy-In

Schmidt says that after a few reorganizational bumps in his first year, his unit now gets the top-down support he needs, which is why he's stayed put for three years. While not every security objective is realized — security and business must give and take to work together — the most telling sign of support was when Microsoft's CIO merged physical and data security into one department last month.

This top-down support is also what has drawn a veteran security manager, who asked to not be identified, to security management jobs. He has worked in security management positions for the private sector and the federal government. In hiring interviews, he says, it's difficult to pick up on the true level of support for security.

"If you know somebody inside the organization already, they might be able to give you indicators," he says. "You need to talk to the network administrators, for example, and check their level of cooperation."

Inversely, the hiring company also benefits when candidates know someone on the inside. In fact, employee referral was among the top three methods employers use to find information security candidates, according to the

Computerworld survey. Doherty has already pulled in someone he knew from the Army's Criminal Investigative Command's computer investigative unit, which Tanzi says makes him even more happy to have hired Doherty.

But even more companies are cultivating security leadership from within, according to the survey. One such company is Sprint Enterprise Network Services (ENS), an IT consulting firm in Houston. Sprint ENS recently promoted Bachman to help develop and manage a newly spun-out security practice group at the national level.

A year ago, Bachman, a former cryptobreaker at the National Security Agency, wanted to live closer to his family. So he posted his résumé on the Web and interviewed with three companies. Bachman, who has a doctorate in mathematics, took the consulting job at Sprint mostly because of the training and educational opportunities.

Meanwhile, Sprint was looking at him, especially with his advanced degree, as someone to put on a fast track to management. "We're always looking for someone to groom for security management positions for our global projects," says Bob Robinson, practice principal at Sprint ENS.

You can't expect people with senior-level security management skills to fall into your lap, Robinson says, so career development is crucial. Sprint starts by hiring people with the basic certifications — Cisco Network Administrators, Certified Cisco Internetworking Engineers or even a Check-Point Firewall engineer. Those with management potential like Bachman are identified, trained and mentored.

Not only do training programs help solve the problem of where to get security professionals, but they also help keep them. Because of such programs, Schwab's attrition rate for its IT staff was less than 10% last year.

"We focus on retaining talent through internal growth. We're constantly asking our employees, 'What do you want?

What do you need to refocus our value proposition so you can get what you want out of your job?' " Merrill says. "It's really expensive to find people, so it's better to retain them."

Bachman is currently developing a security management curriculum for Sprint. He says his goal is to grow his own crop of security project managers to support his new organizational and service objectives.

And, he says, as long as he can create, build, design and work hands-on, he'll stay around awhile. "Call it geek pride," Bachman says. "I think a geek feels as much pride in his creation as an artist does with his painting." ▀

Next Candidate, Please!

Publix Network Corp., an Internet service provider in Hamden, Conn., is preparing to go public in the next six months. But until now, the company's security oversight has been handled by Chief Operating Officer Peter Zackowski, who hired a part-time security consultant on an as-needed basis.

Like all start-ups, Publix isn't flush with money. About all it can offer a new security director is stock. Zackowski says he decided to bypass human resources and go through a headhunter. The headhunter saw the salary range and then sent candidates accordingly.

"The first candidate showed up in the largest pair of Fabu [slap-slap-leg] jeans that really show off the plumber's side and props his feet up on a chair. After I introduce myself, he says, 'When do I start?' " Zackowski says. "The next candidate believed that an unmarked body was a spiritual statement. He reeked. During the interview, he lifted his arm and sniffed, like he was smelling a delicate flora."

Even if Zackowski could get beyond these behaviors — and, he says, he considered it — he couldn't hire either candidate, because neither possessed the skills he claimed to have.

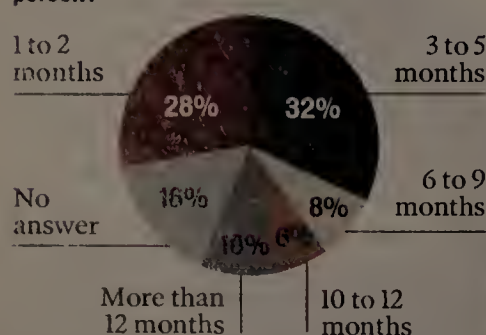
The message here: Hire to the small company that can't easily afford or attract senior-level security professionals.

"We changed our request for a more managerial type on Aug. 7, and so far no one's walked through the door," says Zackowski. "The headhunter said he's sending these people, but I haven't even seen a résumé." — Deborah Raskin

Hiring Security Officers

How companies hire senior-level information security personnel:

How long did it take you to fill your senior-level information security position, from defining the job description to hiring the person?



What were the three most important criteria used in selecting the final candidate?

TOP THREE ANSWERS	NO. OF RESPONSES
Technical and practical knowledge of security issues and trends	32
Previous experience at integrating security and core business processes	28
Ability to execute	21

What incentives have you used to attract candidates?

TOP SEVEN ANSWERS	NO. OF RESPONSES
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Growth potential	20
Progressive, security-conscious environment	18
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Location	8

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AFTER SIX MONTHS, C. William McCurdy and the Lawrence Berkeley National Laboratory are still searching for a CIO. The right candidate can be hard to find

ERIC MILLETTE

Searching For Insiders

Finding industry-specific IT leaders isn't impossible, but it doesn't come easy. By Melissa Solomon

WANTED: A SCIENTIST WHO'S NOT going to be doing much science. It's a job that C. William McCurdy, associate director for computing sciences at Berkeley, Calif.-based Ernest Orlando Lawrence Berkeley National Laboratory, has been trying desperately to fill, without much success.

"We've been looking for six months," McCurdy says of the search for a new laboratory CIO. "It's driving us nuts."

The problem is that Lawrence Berkeley needs a candidate who can guide the vision for the lab's information technology infrastructure while still providing management and business leadership.

In addition, the right candidate must be an advocate for scientific computing at a laboratory that's involved in such high-stakes research as the human genome project and that's home to one of the world's largest supercomputing centers. And to do

Continued on page 71

By S.J. Holmes

That's why companies such as

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HOLDING IT ACCOUNTABLE
NEW ACCOUNTING STANDARD for software development will force dramatic changes in the way IT projects are run, reports Kathleen Melymuk.

WANT TO LEAD?
Do you have what it takes to inspire and influence others? CIOs reveal what they look for in potential leaders. Page 54

E-COMMERCE PITFALLS
Web shopping may be easy, but technology problems and poor processes could keep the customers away. Page 48

XML GETS BUSY
XML starts to deliver on its starry-eyed promises, but with every silver lining there's a cloud or two. Page 78

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Continued from page 68

so, he must be a scientist himself, says McCurdy.

"There is a very high emphasis placed on the scientific capabilities of managers," he says. "It makes a scope of a job that's really interesting and challenging."

In the meantime, McCurdy continues his search, all the while acknowledging to himself that he's up against great odds because of the dearth of CIO candidates with the right mix of business and technology credentials and scientific know-how.

But headhunters who specialize in high-level IT placements seem far more confident of McCurdy's chances than he does. In fact, they say, it's quite common for IT executives to have extensive training and experience within a particular industry or a specialized sector, such as biotechnology or discrete manufacturing.

"I'd say it's very common. Whenever I get a CIO search... the criterion is you're always looking for someone who's had the operational side," says Karen Simpson, an account manager who specializes in IT searches at Ajilon, a Toronto-based executive search firm. "A CIO for a bank is probably not going to be as effective going from a banking environment to a retail environment. There's a big learning curve."

The best strategy for finding a top-level IT executive with extensive industry experience, say headhunters, is to look within the walls of your major competitors.

"What Berkeley would want to do would be target other laboratories' [CIOs] and cold-call them," advises Tammy Anderson of Lysen Anderson Executive Search Inc. in Atlanta.

But Lawrence Berkeley has an added challenge, explains McCurdy: It's located in Berkeley, Calif., a stone's throw from Silicon Valley, where IT executives are paid top salaries and the cost of living is among the highest in the nation.

And because the laboratory is a nonprofit institution funded by the U.S. Department of Energy, there's not much room for salary negotiations. The salary range for laboratory directors runs between \$115,560 and \$184,800 — and only a very few of the laboratory's national division directors fall at the top of that range, he says.

"Someone who has corporate experience of this level would expect something a little bit higher, plus some level of corporate equity," he says. "We are at the whim of the Department of Energy."

Strategies companies can take to expand the pool of candidates, says Anderson, are to look for lower-level professionals with industry-specific experience who are ready for advancement, and to cold-call people who aren't job-hunting. "Maybe 10% to 20% of the talent pool may be surfing the Web looking for a job," she explains. "If you try to attract the cream of the crop among the 80% as opposed to the 20%, you're going to see a higher caliber of candidates."

Selling the Work

Reputation is the biggest selling point for positions at the American Civil Liberties Union of Northern California, says executive director Dorothy Ehrlich.

"I think all people in nonprofits will find it hard to compete with the private sector," she says, "but there tends to be some self-selection... among those who want to work for justice and to bring their own technical experience to bear."

The San Francisco-based branch of the civil rights organization recently filled a position for a new computer systems manager who will be responsible for implementing and maintaining the

organization's long-range technology plan.

"It's a very important position. They absolutely have to be technically qualified," says Ehrlich. "But we want someone who is committed and cares about our goals."

The ACLU advertises positions through both nonprofit and mainstream publications. When an attorney position opens up, applications come flooding in because many lawyers have always dreamed of working for a high-profile political organization like the ACLU, says Ehrlich. In contrast, an IT-related position "is a little harder. We don't get hundreds of applications. It's a highly specialized area."

But, she adds, "We cast a very wide net and you end up with people primarily interested in providing this technological expertise, but who always wanted to work for the ACLU."

A bigger challenge than recruitment, she says, is retaining employees.

"People are lured back into the private sector very often," says Ehrlich. "It's genuinely hard for people to pay the rent and work in nonprofit."

Lawrence Berkeley, like the ACLU, relies on the impact of its work in attracting job candidates, says McCurdy. The new CIO, he says, could play a role in work such as experimental cosmology and supernovae experimentation, "both of which I think have the potential of landing someone a Nobel Prize."

The CIO would also work with the laboratory's director for its portion of work on the human

genome project. "It provides a range of work that will propel somebody's career if they take this job and can do it for five, 10 years," he says.

"There will be no great scientific laboratories in this century without an information technology infrastructure," he adds. "That part of the vision belongs to the CIO; in that regard, it's very attractive."

Room to Grow

While industry experience is critical for many CIOs, some companies keep an open mind about candidates so they can attract the most qualified executives.

Paidos Health Management Services Inc., a Chicago-based national disease management company that specializes in neonatal services, is in the midst of a search for a CIO. The job description calls for a candidate who can provide leadership for the development of IT systems at Paidos as well as an "understanding of finance, business operations, clinical processes and managed care." The ideal candidate would have a degree in health care and/or computer science.

But Paidos hasn't limited its search to those within the health care profession, says Linda Hodges, executive vice president at Hersher Associates Ltd., the Northbrook, Ill.-based IT health care executive recruiting firm that's conducting the search. Organizations like Paidos that "feel they have enough depth or strength that they can allow a person adequate time" to get up to speed on health care issues try to look beyond the industry for top talent, she says.

"It depends on the position and the organization," Hodges says. "Health care experience in some organizations is critical... But we have seen a number of CIOs make the transition from other industries."

One high-profile example is Joseph Smialowski, the former Sears, Roebuck and Co. CIO who jumped industries in 1998 to become CIO at BankBoston (which has since merged into Fleet Bank and is now known as FleetBoston Financial).

But Smialowski is the exception to the rule, says Anderson.

At San Francisco-based Blue Shield of Northern California, health care experience was a critical factor in the company's search for a CIO, according to Chief Financial Officer Paul Swenson.

"For us, it was important to have somebody who just understands what we were doing," he explains.

Blue Shield hired David M. Bowen as CIO last spring after a formal search that lasted nearly a year and yielded only four relatively serious candidates.

One edge to hiring Bowen, a former CIO at San Francisco-based hospital chain Catholic Healthcare West and at Baptist Health System Inc., a hospital and health maintenance organization network in Alabama, is his ability to help Blue Shield navigate its way through the Health Insurance Portability and Accountability Act, which was passed in 1996 and is expected to take effect within the next year. The technology regulations are aimed at protecting the privacy and security of patient information.

Because of his background, Bowen will also be able to communicate the company's IT infrastructure needs to the doctors, who are notoriously resistant to technology, says Swenson.

But before it found Bowen, the search committee started doubting its chances of finding the ideal candidate.

"Can you find the right balance of person who brings technology, health care and management [expertise]?" asks Swenson. "There's not many of them out there." ▀

Casting the Net

There are several strategies for finding a top-level IT executives with extensive background and expertise in a particular industry, say headhunters. They include:

- **Targeting CIOs from your major competitors.**
- **Spending about six months researching the field of potential candidates.**
- **Identifying qualified professionals who aren't looking for jobs, and cold-calling them.**
- **Considering industry insiders in lower-level positions who are ready to move up.**
- **Placing advertisements in mainstream and industry publications.**

— Melissa Solomon



McCURDY: CIO search is "driving us nuts"

ERIC MILLETTE

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MANY PEOPLE harbor dreams of pursuing some other career, but practicalities usually rule out experimenting with new types of work.

But information technology professionals who have long toyed with the idea of teaching are in luck. Many universities and colleges are seeking those who have real-world experience to conduct classes in technology or even business. You could teach those who want to learn programming, gain a vendor certification such as Microsoft Certified Systems Engineer or better understand how business operates on the Web.

Although the pay is relatively low, the rewards can be high, including personal satisfaction and even the chance to meet potential employees, business partners or customers.

Finding an Opportunity

But first, a teacher needs a classroom. For some, finding one involves calling department heads or even human resources personnel at local schools. Many, though, come across opportunities through word of mouth.

"My old manager used to teach at a community college and asked if I wanted to teach a class," says Michael Moore, a network analyst at insurance company network Harleysville Group Inc. in Harleysville, Pa. Each semester, Moore teaches a networking class to help people get Microsoft certification. "I spoke to the dean of the college of business and computing, gave him my résumé and interviewed with him, did some impromptu teaching [as part of the interview process] and was hired."

David Friend, a former engineer who is CEO of Boston-based teleconferencing provider eYak Inc., stresses the importance of finding the right atmosphere. "I took a year out and taught at the Sloan School at MIT," says Friend, who was asked by a member of the faculty to co-teach a class in business and entrepreneurship.

"I think it's important to be in an environment where the students are stimulating. I can't imagine I would have been happy teaching someplace where the students aren't as bright as they are at MIT," says Friend.

A school typically is ready to help a would-be teacher learn how to develop a syllabus and find resources on campus. But instructors had better bring their own time-management skills to schedule the time needed to prepare teaching materials, write tests and grade students' work.

"I didn't know how I was going to do it," says Jorden Woods, chief technology officer at GlobalSight Corp. in San Jose, who is teaching a course on implementing global e-commerce for San Jose State University's e-commerce management program. His schedule



WHEN JORDEN WOODS, GlobalSight's chief technology officer, started teaching, "I was nervous, especially because in this day and age, students are much less complacent," he says

TEACHING ON THE SIDE

IT managers who have dreams of teaching as a second career are in luck: Colleges and universities are desperate for your real-world technology and business expertise. By Erik Sherman

had him working 16 hours per day, Monday through Saturday, plus half a day Sunday, making it difficult to prepare a course syllabus. "There were a lot of late nights where I was in the office sometimes until midnight or 1 in the morning," he says.

Aside from the long hours, Woods says, he felt a lot of pressure at first. "I was nervous, especially because in this day and age, students are much less complacent. They want a lot more personalization, and they want it now," Woods says. But teaching has given

him a professional advantage, he says, providing him with speaking opportunities, exposure for his company and, as in Friend's case, the chance to meet potential employees.

Continuous Learning

There are other pressures, too. "There is always the pitfall of the aggressive student," says Timothy Smith, vice president of strategic development at Kinkos.com Inc. in Alexandria, Va., and a former government employee who teaches at the Defense Intelligence

The College View: Dying to Meet You

While schools look for certain characteristics in teachers, the foremost at the moment might be visibility.

"Last January... I was desperate," says Dr. Lee Bender, chairman of the business and computer science division at Montgomery County Community College in Blue Bell, Pa. "About 10 days before the semester began, I had 10 sections of courses unstaffed in the computer area." A massive e-mail campaign helped him find the people he needed, but Bender's experience shows that instructors are in high demand.

"The field is growing much faster than we're producing teachers," says MaryAnn Robbert, chairwoman of the computer information systems department at Bentley College in Waltham, Mass. "The industry is offering a lot more than we are, and the job market is hot."

Desperation doesn't mean capitulation. Applicants must have the technical chops to teach their specialties, notes Robbert. Those who are generalists in IT should consider introductory classes, as higher-level instruction requires more depth of knowledge in a subject. Whatever the case, never embellish credentials.

"Something that turns me off are phonies: people who come in and say 'I've done that,' and when you've talked to them, [they] have done nothing," Robbert says. There are always faculty members who will see through that.

Robbert — and other deans and chairmen — say they also look for "an interest in teaching."

Pay is typically far below what an experienced technologist can make, so colleges want to find teachers motivated by factors other than money. People can determine whether they have the bug by giving presentations and offering to perform free guest lectures.

Remember, too, that as IT touches more aspects of life, there are teaching opportunities outside computer and business programs.

"Information technology has become a key feature for us," says Gus Friedrich, dean of the School of Communication, Information and Library Studies at the New Brunswick, N.J., campus of Rutgers University. That means opportunities for IT professionals, and also some necessary attitude adjustments.

"One of the things I try to explain is that these students are really bright, but they're not the same as you," says Friedrich. "Don't sell them short, but don't make the assumption that they're just like you. You're going to have to bring them into [the subject]."

— Erik Sherman

College in Washington. His classes are about how to use the Internet in intelligence gathering and dissemination.

"They want to get you and prove, one way or the other, that you are not as smart as you think you are," he says.

That means spending time keeping up with industry developments. "I probably spend 10 to 15 hours a week [keeping current] through literature, through research, through talking to people," Smith says. "And because of my role at Kinkos, I talk to a lot of vendors, potential partners, other Internet start-ups. I'm fortunate that my job keeps me in the flow of what's current."

In fact, presentations at Kinkos.com are as useful for Smith's teaching as they are for his day job. "I love the folks who come in and give me the generic market information," Smith says. "I'll go, 'Can I have that slide? Can I use those?'"

Sherman is a freelance writer in Marshfield, Mass.

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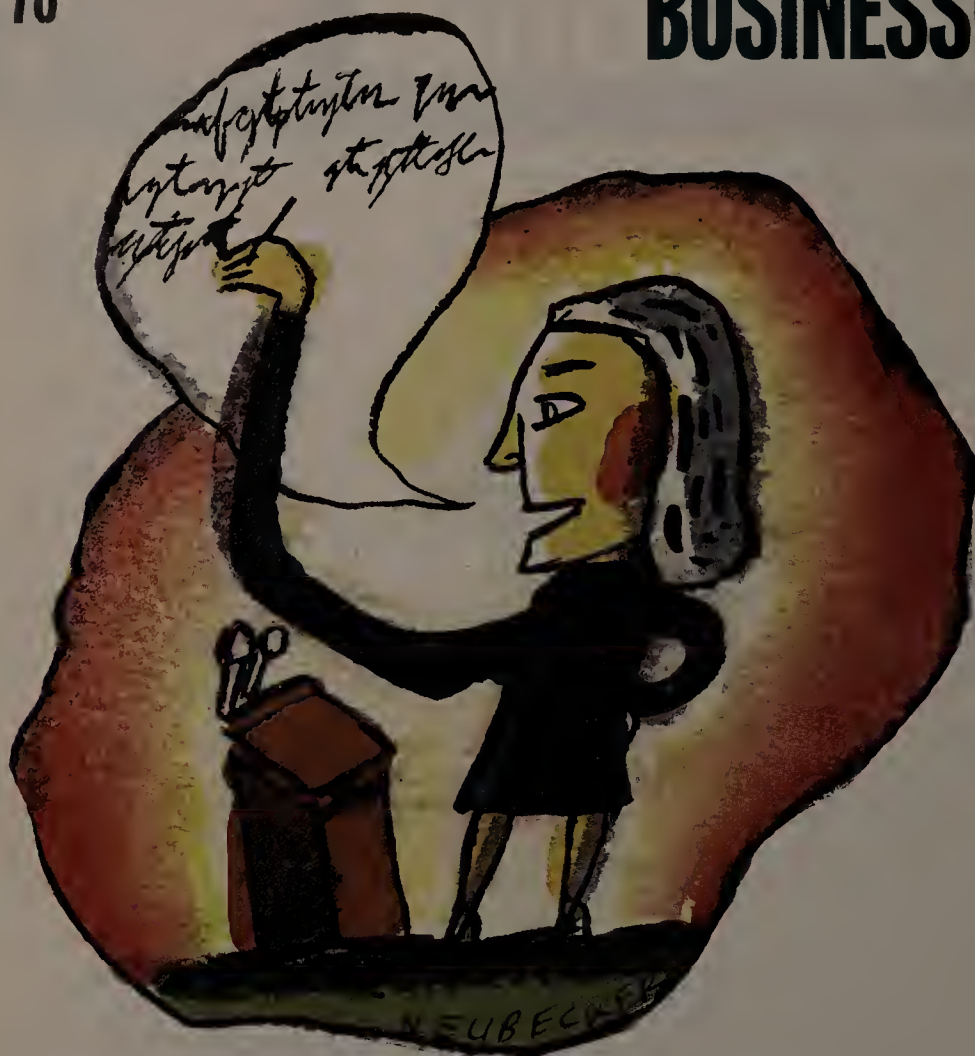
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Getting the Word Out

Consultants find writing and speaking to be an effective way to build business — and expertise. By Leslie Goff

DAVE CROWLEY, an independent SAP consultant in the northern Michigan hamlet of Traverse City, went global last year. Less than a year after launching his independent consulting practice, Acre Wood Consulting LLC, he picked up a gig in Australia and was getting inquiries from companies in India.

He says he owes his instant international reputation to a marketing tactic that cost him essentially nothing and through which he actually made money. The globalization of Crowley's practice took off after he published two articles about SAP consulting.

"Without [my] being published, they would never have found me," Crowley says of his Australian client. "I didn't have an international presence, and I don't have a lot of people working for me. But writing positioned me as an expert in my field and brought me attention — and at no cost."

In fact, the writing opportunities just

fell into his lap, Crowley says. A colleague he met at an SAP user conference later passed his name along to an editor at *Inside Technology Training* magazine who interviewed Crowley for an article. At the end of the interview, the editor invited him to submit an article on what makes a good enterprise resource planning team.

Spurred by the success of that experience, Crowley wrote a first-person column that he sent to *Contract Professional* magazine, which published the submission. He earned fees for both stories.

Crowley's coup highlights how publicly establishing your expertise can be an effective and inexpensive route to building and expanding a consulting business. Publishing articles, getting a book deal or making speaking engagements helps you put yourself out there and also helps you get a much better handle on your own skills.

"Categorizing a lot of the technical information that I've accumulated over the years has helped me put it all to-

gether into a more accessible format," says Robert Parkinson, a consultant in Roseville, Calif., who co-authored *Basis Administration for SAP* (Prima Publishing, 1999).

"I was surprised at how much I knew. Once I sat down and actually began writing, the information actually flowed more easily," Parkinson says. "It helped me in my day-to-day consulting to cover areas that I had worked on previously but not regularly. In essence, I produced a diary of a lot of SAP knowledge that I've accumulated over the years."

Publishing and presenting also establishes credibility with potential clients, easing the process of lining up new gigs, consultants say. When a prospect contacts you after reading your work or hearing you speak, you've already sold your skill set. You can get down to the nitty-gritty of discussing the client's problem and how you can solve it, rather than explaining why you're the right person for the job.

For Jim Gray, a principal at Conval Software Inc. in Moorpark, Calif., that's one of the key benefits of the time he logs preparing public presentations. "The job interview can be about a solution," Gray says. "You've already gotten in the door and past the initial introductions. I can't say what impact it has on the bottom line, but it does help with gaining clients."

Gray says the real appeal for him is getting a message out. "There's an evangelistic impetus behind it," he says. "When you're a consultant, you work with a lot of companies, you see the same problems over and over and know that solutions are available. I'm motivated to see if we can address the problem and see people have more successes."

Building Business

For many consultants like Gray, the hard part of writing and presenting isn't finding something to say but finding the time to say it.

You have to incorporate it into your regular schedule, says Stephanie Smith, an independent applications developer doing business as GWIJ Systems Inc. in Plano, Texas.

By keeping up with the latest topics, Smith says, she's ready to tackle a new presentation whenever the opportunity arises. That way, if she gets a request for a proposal to present at an upcoming conference, she already has fresh material for a bid. "It's also a good thing to do when you're on the bench," she adds.

Writing a book may offer the biggest payoff — financially and in terms of exposure — compared with writing articles and making speaking engagements. But it's also the most demanding and time-consuming venture.

Publishing and Presenting: A Primer

Getting started in publishing and presenting usually happens the old-fashioned way — by networking. Someone you chat with at a local user group meeting happens to pass your name along to an editor, who calls you to solicit a column. The column lands in the hands of a conference planner, who asks you to appear on a panel. The panel moderator is editing a book and asks you to contribute a chapter. The publishing company is so impressed that it hires you to do your own book, and so forth.

Here's some advice to keep in mind when you're starting out:

- **Start small.** If you've never written or spoken in public before, contribute an article to a local newsletter or arrange to speak at a local user group meeting. With a few clips and presentations behind you, you can tackle a national publication or conference presentation.
- **Focus on what you know** — don't encumber the new experience of writing or speaking with a topic that's unfamiliar to you.
- **Make the research for an article or presentation part of your regular routine.** Keep a journal of problems you've encountered at work and how you resolved them, or keep an archive of news clips on topics that interest you. Then, when an opportunity comes your way, you already have material to develop.
- **Don't measure the benefits monetarily.** Unless you write a best-selling book, publishing and presenting aren't likely to bring in huge fees. Consultants who regularly write and make public appearances say the payoff comes from broadening their exposure, establishing credibility with prospective clients and building self-confidence. — *Leslie Goff*


SOURCE: COMPILED FROM INTERVIEWS WITH DAVE CROWLEY, ACRE WOOD CONSULTING; ROBERT PARKINSON, AN SAP CONSULTANT IN ROSEVILLE, CALIF.; JIM GRAY, CONVAL SOFTWARE; AND STEPHANIE SMITH, GWIJ SYSTEMS.

Parkinson notes that he had to put his personal life on hold during the 10-month process of writing *Basis Administration for SAP*. He spent most of his free time writing — before and after work during the week, as well as several hours on weekends.

But the book has led to other writing opportunities, as well as to speaking engagements. "The amount of time and effort put forth in the book was done as a labor of love, with the intent of promoting my consulting career," Parkinson explains. "The monetary benefits are few and far between — you don't get rich writing these books. The intent was to enhance my consultancy... [and] the response has been so positive that I think it will become a necessary part of my practice." ■

Goff is a freelance writer in New York. Contact her at lgoff@ix.netcom.com.





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Technology Brief

For NaviSite, There's No Such Thing as Second Tier

For this service-minded hosting company, every one of its e-commerce clients deserves the same thing: to be treated as if its business depended on its web site

By Randy Cronk

Andover, Mass.-based NaviSite Inc. is a leading provider of outsourced managed web and application hosting for companies conducting mission-critical business on the Internet. It's a company with a special perspective on what it takes to be a successful host. That's because, until 1997 NaviSite was CMGI, Inc.'s internal hosting and infrastructure provider. CMGI is a network of diverse yet interconnected companies all holding leadership positions, or the promise of leadership, in Internet-related businesses. (In 1999 alone, CMGI launched or acquired 35 such companies.) In other words, NaviSite "grew up" hosting Internet sites for some of the world's very demanding and sophisticated customers.

After being spun off from CMGI in February 1997, NaviSite has continued to have a special empathy for companies that are dealing with the hyper-growth of the Internet age. For one thing, it understands the difference between just renting real estate

and providing a genuine service.

Just ask Pierre Bouchard, NaviSite's director of product marketing. "The way this industry started," he says, "was to provide co-location services. You bring in your own equipment. You install it. You run it. The only things you get from the hosting provider are

space, power and an Internet connection.

Our customers initially were companies that CMG had invested heavily in — so we were strongly motivated to provide them with more than the simple co-location basics. They wanted, in fact needed, us to become a part of their

team and take responsibility for managing critical parts of their website. So management isn't something we've just added, it's something NaviSite grew up with. It's in our genes."

Having a good attitude

That kind of attitude counts a lot with New Economy companies like MarketMax, a Burlington, Mass.-based developer of software for the retail marketplace. In 2000, the company launched Market4Retail.com, a site that lets retailers and manufacturers collaborate online to develop inter-active merchandise, assortment,

promotion and space plans, and optimize product selection in order to better meet consumer expectations. Market4Retail.com is hosted by NaviSite.

Service was clearly a key differentiator, according to Ken Brame, chief technology officer for MarketMax. He says, "One of the challenges on MarketMax's part was that [outsourced web hosting] opens up a completely new world of not being there every day standing over the server. I've never seen the physical server where my site is running. Doing work remotely 100% of the time was definitely a new experience for the company and produced a new set of challenges."

He recounts one experience he had tracking down an errant e-mail. "It was one of those forms the customer fills out that sends an e-mail back to our marketing department. Somewhere along the way the e-mail was getting dropped. NaviSite was diligent about

tracking the e-mail through the different servers to find where it was getting lost. That sounds like a pretty simple problem — but it's a classic illustration of why it's really important for all your part-

ners to talk to each other even when they're not physically in the same room."

Problem solving

To ensure that kind of talking, NaviSite has a program called Problem Resolution Management or PRM. "PRM starts with people in the network operations center who are first to intervene when there is a problem and escalates from there," states Bouchard. "This is an attitude that says, 'I'm gonna be diligent — once I've detected a problem I'm going to get it resolved no matter who the right party is.' We might escalate it to the customer but we're still going to stay in the loop until the problem is solved."

PRM is something every customer gets — even those who may only rent space from NaviSite. "When a customer has a problem, they have an expectation that we will get in there and help them fix it. They don't care if it's not on our price list. PRM is a security blanket.

Whatever sense of urgency needs to be there will be there. There's no such thing as second tier."

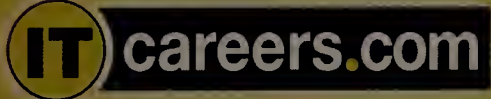
NaviSite was diligent about tracking the e-mail through the different servers to find where it was getting lost. That sounds like a pretty simple problem — but it's a classic illustration of why it's really important for all your partners to talk to each other even when they're not physically in the same room.

—Ken Brame, CTO, MarketMax

Randy Cronk is a freelance writer based in Boston.



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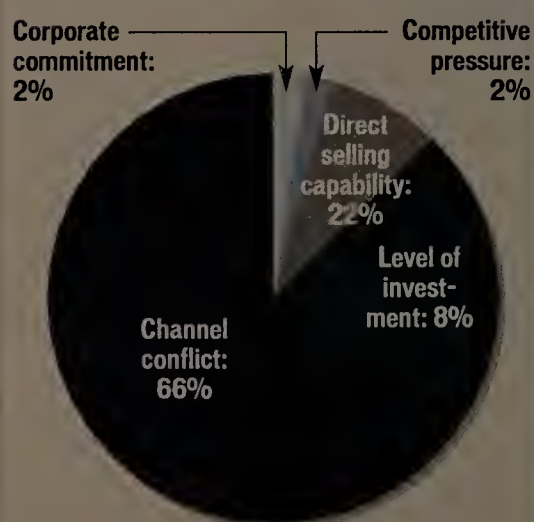
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Channel Conflicts

DEFINITION

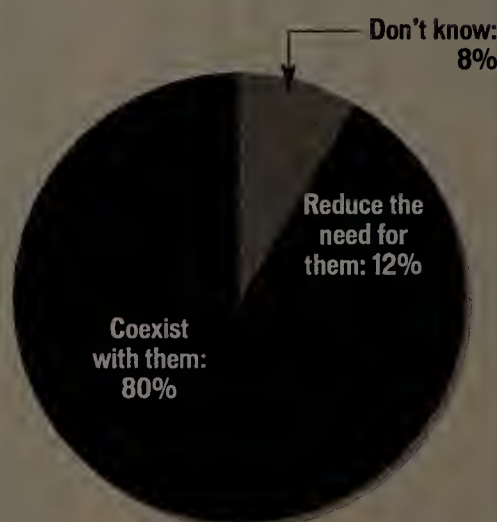
Channel conflicts arise when a new venue for selling products — such as the Web for selling goods or services — threatens to cannibalize one or more existing conduits for selling goods within the same organization, such as a retailer or a manufacturer.

Biggest Issues Facing Manufacturers That Sell Online



PERCENTAGES BASED ON RESPONSES FROM 50 MANUFACTURERS

Impact of the Web on Other Channels



PERCENTAGES BASED ON RESPONSES FROM 25 MANUFACTURERS THAT SELL ONLINE

BY MINDA ZETLIN

EMARKET HOLDINGS LLC, a Stamford, Conn.-based e-commerce consulting firm, was hired last fall to help a multibillion-dollar chemical manufacturer explore opportunities for selling its products directly over the Web. The company's internal e-commerce team had already recommended direct Web sales as a way to better manage its supply chain and interact more directly with customers, says eMarket co-founder Alyse Terhune.

But when the team presented its proposals to the company's CEO, Terhune says his response was terse: "We've done business with our distributors for 30 years, and I certainly don't want to sell around them.

I don't even want to discuss it."

In this niche of the chemical industry, five distributors handle most products, so angering even one could threaten a good chunk of eMarket's revenue. "You had a team charged with exploring the Web as a sales channel, when in fact, the guy at the top was not willing to do it," says Terhune.

Snared in the Web

That CEO isn't alone. He was concerned about channel conflict — when a new sales venue threatens to cannibalize an existing one at the same organization. Channel conflicts have existed for years, but the term has gained prominence in the past year or two as the launch of e-commerce operations has raised a new set of concerns for many companies.

For example, about a year ago, General Motors Corp. in Detroit attempted to buy back some car-dealer franchises as a possible step toward selling directly over the Web. Dealers protested so adamantly that both GM and Ford Motor Co. in Dearborn, Mich., spent a lot of time at a recent industry convention reassuring dealers that the automakers wouldn't sell directly to consumers. And in a recent survey by Cambridge, Mass.-based Forrester Research Inc. of 50 consumer-goods manufacturers, 66% cited channel conflict as the No. 1 obstacle to selling online (see chart).

Retailers, too, are often daunted by channel conflict. In May 1999, Bob Moog joined Paramus, N.J.-based Toys R Us Inc. as CEO of its e-commerce

site, Toysrus.com. He left after just three months over what he terms "philosophical differences" with other members of the senior management team and is now CEO of AreYouGame.com, a San Francisco-based online retailer of puzzles and games.

At Toys R Us, Moog says, conflicts arose over a finite supply of its most popular items. "I wanted every Sega I could get and every Barbie doll I could get. And the corporation's position was that they had an \$11 billion [brick-and-mortar] company, and they couldn't sacrifice that for the start-up. There was internal confusion about how to best maximize both opportunities."

In hindsight, says Moog, Toys R Us executives made the right call. "Twelve months ago, it appeared that to have Toysrus.com come out and be a market leader and to do an independent [initial public offering] would be a very valuable thing for the shareholders," he says. "But now, the market isn't valuing online companies the same way it was then. It's much more important for Toys R Us to maintain and improve its core business. So I think the Toys R Us management team looks smart today for those decisions."

Fashion Statement

Levi Strauss & Co. decided to bypass retailers altogether when it started selling its products online in 1998.

"We launched e-commerce sites for Levi.com and Dockers.com," recalls Jeff Beckman, a spokesman for the San Francisco-based company.

"Fashions were changing pretty rapidly in the late 1990s," he explains. "We saw a resurgence of interest in khaki, and younger consumers were looking for more fashion-forward types of denim products. We saw an opportunity to create relationships directly with consumers."

But Levi courted channel conflict by forbidding retailers from selling its products online as well. Late last year, the company pulled the plug on

sales at its online sites, which now offer only information. Instead, the Web sites direct customers who want to buy over the Net to online retailers.

On the other hand, channels can complement one another, so that a successful Web site can have a beneficial ripple effect for a company and its partners. For instance, visitors who go to AreYouGame.com can "ask us about a product, and if for some reason we don't have it available, we ask where they live and we send them to a retailer in their area," says Moog.

"What many retailers fail to understand is that manufacturers' catering to consumer needs online pushes the brand and the product and creates a happy consumer, who in turn will continue buying," says Lisa Allen, an analyst at Forrester Research and author of the channel-conflict report. Ultimately, she notes, customers will decide where and how they want to buy products. Manufacturers and retailers should be prepared to sell to them in the venue of the customers' choice or risk losing them to competitors that are.

"The wise approach is to recognize that the goal is to serve the customer and not to preserve artificial turf boundaries," Allen says. "In some instances, channel conflict should crumble." ▀

Zetlin is a freelance writer in Woodstock, N.Y. Contact her at minda@mindazetlin.com.



The goal is to serve the customer and not to preserve artificial turf boundaries.

LISA ALLEN,
FORRESTER RESEARCH

P\$\$\$\$T.

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Feature Article
**How to Draw up a
RFP for Your
E-Business**

The explosion of the new e-economy has irrevocably altered the best practices for all businesses, from global Fortune 50 companies to shoestring startups. While you can't take your eye off the ball where business fundamentals are concerned — witness Wall Street's recent puncturing of dot-com companies that thought profits were for the birds — many long-held business beliefs are now at least open to question.

With technology driving business, IT plays a bigger-than-ever role in the corporate decision-making process. IT organizations are leveraging their long-standing knowledge of requests for proposals (RFP) to e-business. RFPs have always been a key part of choosing the right partners, so using them to create your e-business initiative makes sense.

Creating an RFP will help IT ensure a successful transformation. Given the importance of e-business, it's no surprise that businesses are turning to companies like WorldCom, which provides facilities-based and fully integrated services to facilitate e-business and e-commerce in the digital generation. With its experience and broad range of offerings, WorldCom is the ideal partner for any company.

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Underwritten by WorldCom and produced by Computerworld Custom Publishing.

Upcoming stories you will find on WorldCom Solution Center in October include a feature story on WorldCom's Interact, which provides customers with the ease of purchasing corporate telecommunications over the Web. Another story will highlight WorldCom's Customer Interaction Solutions (formerly named Call Center Services).

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generation d

The WorldCom logo, featuring a stylized star above the word "WORLD" and the word "COM" to its right, all in a bold, sans-serif font.

Dear Career Adviser:

I am fortysomething with a recent MBA in e-commerce marketing. I also have more than five years of experience in mainframe programming and application design, backed up by another degree in computer science. I'm interested in consulting and research-type work —

working no more than approximately 40 hours per week — in a challenging e-commerce dot-com environment. Do I have the right skills to be hired?

— HIGH-IMPACT PLAYER

Dear High Impact:

Your technical background might make a positive difference as you compete for new jobs, but not necessarily, cautions Kay Meyer-Coe, a staffing manager at Cross-Commerce.com Inc., a pre-initial public offering (IPO) e-commerce infrastructure company in San Francisco.

"First, you'll be competing against other new MBAs, and second, the multitier development environments of the typical dot-com are very different from your mainframe background," she says.

In addition, you'll need some hands-on experience to gain professional credibility as a consultant before this career path really opens up to you at a high level.

"Right now, you're best off finding a job in technical

product marketing with a good mentor to guide you, so you can really see how things work in an e-commerce environment," says Meyer-Coe.

Also remember that your 40-hour-per-week workload maximum could turn off most pre-IPO companies that require motivated employees who can work long hours.

Dear Career Adviser:

I work in the Middle East and intend to move to the U.S. for better job prospects. I have a stable job and a month's leave when I can go to the U.S. and hopefully secure a job. I'm a Microsoft Certified Systems Engineer and a Cisco Certified Network Associate with four years' experience. I've tried using sites like Monster.com to no avail. Will I get a better response by physically being there?

— U.S.-BOUND

Dear Bound:

Whether you're outside the country or just in another

state, you're obviously at a disadvantage in the job hunt if you aren't physically present. Being available to interview and start work is what counts.

"Today's job market moves quickly, and positions open and close in a matter of days," says Steven Scheer, operations manager at Craigslist.org, a widely known San Francisco-based high-tech job board.

Although your technical skills are certainly in demand and employers will be interested in snagging you, several issues make you a "high-overhead" candidate. First is the issue of your relocation. Many employers simply don't have the money or time to finance those expenses, let alone to handle your a new employee's visa status.

If you're just trying to relo-

cate within the country, you can improve your chances by giving potential employers advance warning of your plans to be available for local interviews and your commitment and timetable for relocation. If you are from outside the country, you'll have better luck by starting to work for a multinational U.S. company in your home country and then keeping your ear to the ground for stateside opportunities.

Dear Career Adviser:

I heard that a report by Forrester Research Inc. says two-thirds of dot-coms are expected to fold within a year or two. How does this forecast affect computer careers? What

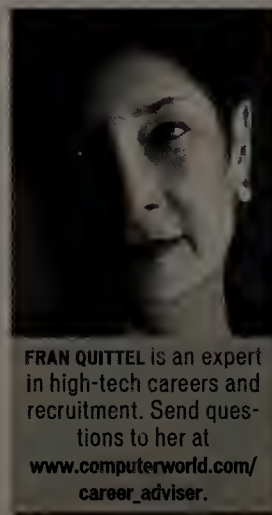
about middle-aged people who are thinking of computer programming as a second career?

— WORRIED

Dear Worried:

This definitely is a job market of the haves and the have-nots based on technical know-how and, secondarily, youth. Some dot-com

businesses may be folding, but new and more mature companies are expanding. They are hunting hungrily for experienced talent, which is even tighter as baby boomers retire and technology jobs increase.



FRAN QUITTEL is an expert in high-tech careers and recruitment. Send questions to her at www.computerworld.com/career_adviser.

On one hand, if you're a programmer who can use interfaces to connect all levels of applications or a server-side Java engineer, a front-end Web developer or an expert on the Java 2 Enterprise Edition platform suite or the XML standard, you're riding the gravy train, says Dan Grosh, a senior San Francisco Bay area recruiter who's worked for large and small companies alike.

But the challenges can be insurmountable if you're middle-aged and trying to enter the programming field with minimal technical skills. Firms are trending toward increasingly younger technical teams, says Grosh, and young companies don't have the bandwidth to offer technical mentoring to newbies.

Therefore, if you are an experienced techie seeking a high-profile career at a dot-com, use your initiative to keep up-to-date with frequently changing technology trends. You're always worth more if you can hit the ground running. And if you're starting from the ground up, pick one high-profile technical skill that's much needed and learn it inside out.

Do schoolwork, homework and volunteer work. Exhibit a staggering willingness to learn and a voracious eagerness to pick apart applications on your own time. Then seek your future at a larger company. There, project teams are more likely to offer you the opportunity to learn in groups. ▀

BRIEFS

GetThere Lands American Airlines

Online travel marketplace GetThere Inc. last week said American Airlines Inc. has joined its network, which targets businesses and offers air, hotel and car services directly, bypassing traditional computer reservation systems. The GetThere marketplace also includes British Airways PLC, The Hertz Corp., Marriott International Inc. and United Air Lines Inc. Menlo Park, Calif.-based GetThere was acquired last month by rival Sabre Inc. in Fort Worth, Texas, for \$757 million.

Bid.com Wins Media Bid

Mississauga, Ontario-based e-commerce service provider Bid.com International Inc. last week announced it entered into a three-year agreement with News International PLC, the flagship media business unit of London-based The News Corp. and publisher of a number of newspapers, including *The Times*, *The Sunday Times*, *The Sun* and *News of the World*. Bid.com will provide e-commerce services to enable News International's online ventures to sell reader offers and branded products through the Internet using a blend of fixed- and dynamic-pricing formats.

CEOs Narrow Their View of CIOs

Building customer relationship systems is information technology's single biggest contribution to competitive advantage, according to The World IT Strategy Compass Census 2000, a survey of 400 CEOs from some of the world's largest corporations. The survey was commissioned by Reston, Va.-based management consulting firm Compass America Inc.

CEOs who participated in the study also said they believe that CIOs' key tasks are to provide systems to support business strategy, keep users and managers satisfied, run an economical IT operation,

build a sound IT infrastructure and introduce relevant new technologies. CEOs are less convinced that CIOs' responsibilities should include transforming the business through IT or contributing to the business.

Dell Names New VP

Dell Computer Corp. in Round Rock, Texas, appointed Russell Holt as vice president and general manager of the company's storage systems business unit.

Holt will oversee worldwide development and marketing of the firm's PowerVault storage products. Prior to his new position, Holt was vice president and general manager of Dell's departmental and workgroup PowerEdge servers and di-

rector of engineering for the company's server products.

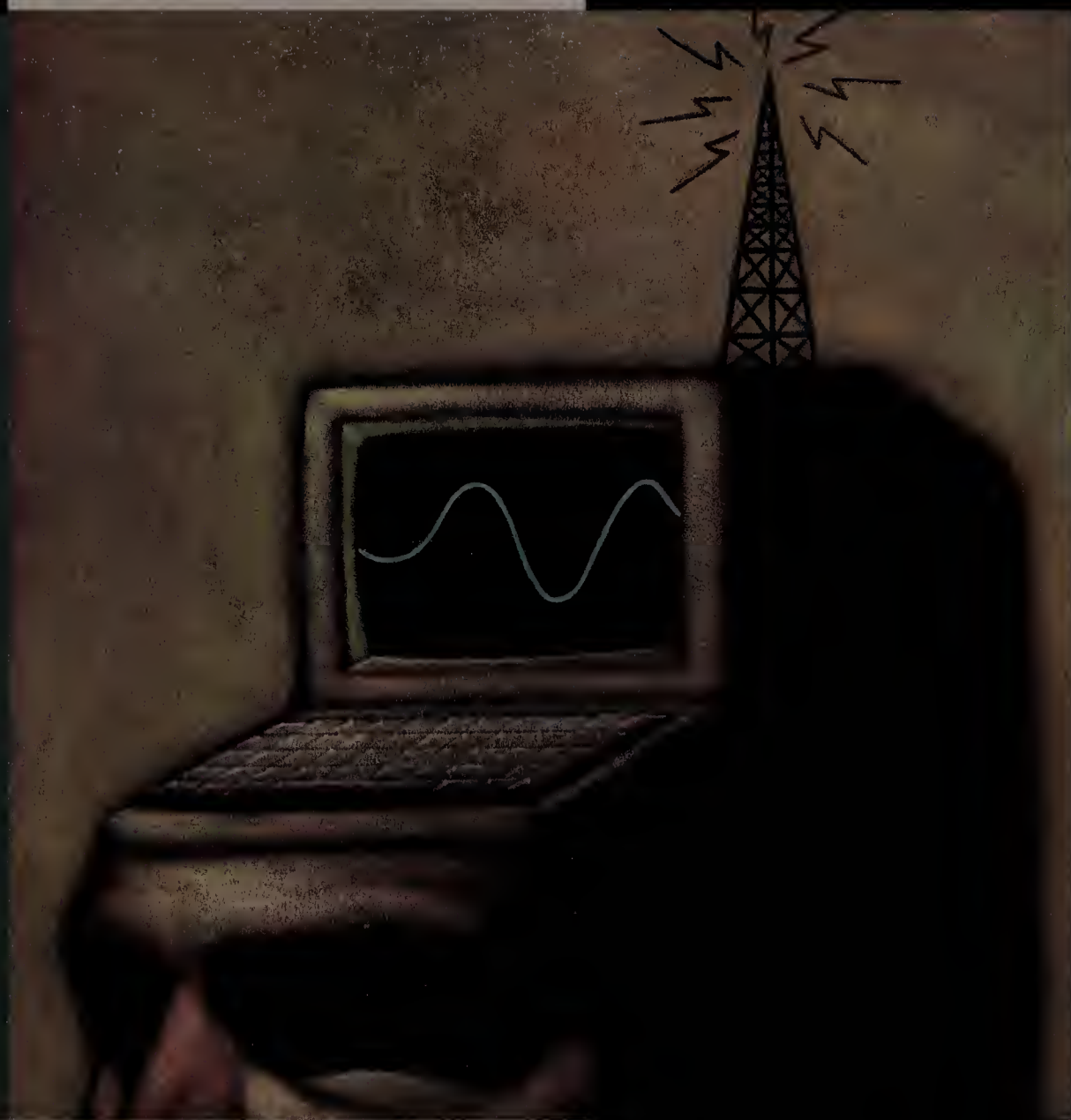
Index Shows Job Growth Slowing

The economy is still growing, and college students still have many job options, but the growth is slowing, according to Los Angeles-based Jobtrak Corp.'s Monthly Index, which monitors job-posting data at colleges and universities across the nation. The August index shows a 6.9% increase in job openings posted last month with an average starting salary of \$36,607 compared with the same period a year ago. This is down from a year-to-year high of 50.4% in March.

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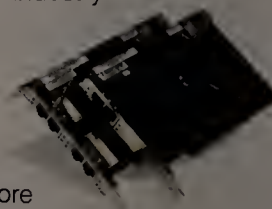
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CONVERGENCE

LOGICAL & POSSIBLE

For decades, vendors and users have talked about converged voice and data networks, but did nothing about executing them. That is until now. The technology, applications and vendors needed to make voice and data convergence work have matured, making it possible for it to work. The adoption of convergence took so long to happen because of the following reasons:

By
Deborah
Cooper

- Slow technology evolution
- Lack of application development
- Minimal customer demand
- Embedded investments and entrenched business processes
- High cost of ownership

While a global infrastructure has appeared to support a range of convergent environments, those five reasons are also affecting the rate at which businesses adopt convergent applications.

Technology evolution

After nearly two decades, the infrastructure now exists to support convergence. And to the surprise of most CIOs and their IT departments, it's the telecommunications carriers that are providing the most extensive engines of integration. This group brought to market the technologies for communications protocols which lie at the heart of all convergence.

Now that integrated transport of voice and data exists, the next step is to enable voice conversations to take place in real-time — even when transported over an ATM or IP network. One example of how this is happening is Cincinnati Bell, a local telephone company with about one million access lines (compared with BellSouth's 17 million). It acquired long distance carrier IXC for its data-focused IP backbone to deliver voice services virtually for free over the data backbone. The integrated company is now called Broadwing.

Today, there are numerous devices on the market that are now capable of taking advantage of wired and wireless communications technology. Cell phones are gaining new features every day. Some already support access to the Web, while



laptop, notebook and palmtop computers have already incorporated wired and wireless high-speed modems to increase their users' flexibility in accessing data.

In the realm of convergence, enterprises seek to open their channels of communications to a broad range of potential suppliers, customers and employees. At the same time they must maintain the security of their proprietary information. The multimedia-capable public networks support companies' efforts in this direction.

Application development

Within the enterprise, communications technologies, especially IP networks, enable their users to build intranets to host many corporate applications like finance, human resources and customer records.

Convergent applications link separate applications to each other creating a unified environment to transparently draw on multiple databases to accomplish their tasks. Customers can access information about current or potential orders, employees can find the most up-to-date information regarding corporate policies. Currently moving into the commercial marketplace, unified messaging provides an excellent example of convergent functions such as linking voice, data, fax and other communications media through a single box to users and accessible by telephone, PC and Web access devices such as a palmtop with a browser.

A few pioneering service providers have introduced these unified messaging services which pull together text- and voice-oriented messaging capabilities. Other systems and services, called enhanced or integrated messaging, can tie together multiple voice-mail boxes or multiple e-mail

and fax services, but they don't represent true convergence because they do not combine multiple access media.

Because unified messaging serves the convergence of wired and wireless voice, wireless data (fax and Internet) and Internet e-mail messaging, service providers operating in all three arenas will introduce similar services.

IDC recognizes that unified messaging services may not find automatic acceptance unless the service providers take into account current user behavior. This generally requires users to have the same number for both talking and messages — preferably the user's existing phone number.

Looking at unified messaging software aimed at enterprise applications, IDC estimates that in 1999 there were 799,000 software mailboxes worldwide. But IDC forecasts the total to jump up to 14 million enterprise unified mailboxes by 2003.

Service providers also support this convergent application. IDC believes that wireless/remote access users will drive initial market demand. IDC forecasts the total wireless and remote access user segment will be 7 million in 2002. These business customers are major users of high-tech communications technology. They depend on cell phones, PCs, PDAs, fax machines, voice mail and other sophisticated communications solutions.

Customer demand

Without a doubt businesses are looking favorably at convergent applications. However, most of these applications remain in beta. Still, as more companies take advantage of these basic applications, the data necessary to prove the business case for installation and widespread

Deborah S. Cooper writes for and advises to some of the nation's largest consulting and marketing firms, telecommunications companies and technology magazines and Web sites. She has written articles for CIO and Computerworld, authored white papers for Business Research Group and International Data Corporation and developed vertical market newsletters for numerous telecommunications, financial services and healthcare companies.

deployment will become more available. That's when an increasing number of companies will begin to experiment with convergent applications.

Partially responsible for driving these experiments is the Internet. Look at virtually any Web page and you'll see text, graphics, video and sound integrated on the page, all aimed at communicating a message — all transported as data along the communications infrastructure. Making their way from the host to the access devices, these Web pages get transported over a mix of protocols including frame-relay, ATM, IP and the circuit switch telephone network with a relatively high level of integrity and security.

Viewed this way the Internet represents the epitome of voice, data, graphics and video convergence. While the Internet plays critical roles in many business processes, its convergence technology has yet to be integrated into most mission-critical applications. There are some beta tests going on that enable Web surfers to reach call centers and speak with an operator while viewing catalog pages, but this type of application is still in its infancy.

Embedded investments and entrenched business processes

Companies' existing investments in installed equipment and software stand in the way of growth for convergent technologies. Add to this the fact that businesses slowly change their operating methods and you get glacial adoption rates. Just think of IDC's earlier example regarding the telephone number. Businesses and residential customers don't want to add new telephone numbers to the growing list they already have — home phone, home fax, business phone and fax, e-mail address at home and at work — and

neither do their contacts. This is the main reason that unified messaging has been slow to catch on. The same is true for other convergent applications. Businesses recognize the benefits of convergence but when they calculate added costs for training, new equipment and software, they don't always justify the cost.

With bridges built to existing applications, access provided to disparate databases, and a messaging system in place that potentially integrates multiple media, enterprises must deliver the transaction management essential to conducting business on the Web. Transaction server middleware products bring that solution to the e-business environment. Finally, companies can invest in object middleware that allows distributed application programs to interoperate while delivering the necessary management capabilities to keep the components working together.

Enterprise interest in moving towards these sorts of products has attracted information access, application and collaborative software suppliers. They want to help their customers implement and design corporate portals that will be used within a business or for a business and its key suppliers, according to IDC. This development parallels the growth of consumer portals such as Yahoo! and Excite on the public Internet but these convergent applications deliver private portals accessible only on the company's intranet or extranet. These corporate portals enable authorized users to access search engines for both company and external databases, provide employees with access to recent executive speeches (video and audio) and enable corporations to bring together geographically disparate employees in corporate meetings hosted on the

COMPUTERWORLD

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company's intranet.

These platforms for convergent access and applications are rapidly gaining popularity. IDC surveyed 500 network managers in the United States and Europe in 1998 and found that more than 59% of their companies had an intranet and that more than 75% of companies with more than 2,500 employees had one.

Other platforms for using voice and data convergence are consumer and enterprise portals. IDC draws clear distinctions between the two types of portals. Consumer portals provide a variety of services designed to attract and keep the attention of buyers whose vital statistics are collected by the company to be used to enhance and personalize the customer relationship. Enterprise portals support end-user access to corporate information and applications and target the employee or business partner. But they also aim at building better relationships between employers and employees and between employees and suppliers (via extranets). These improved relationships could lead to increased employee and trading partner loyalty.

These relationships and applications — unified messaging, middleware, businessware and corporate portals — emphasize the importance of pulling together the wide range of information and applications that corporations have amassed over the years. This convergence of sources, tools and media will give companies new ways of conducting business and carrying out mission-critical applications.

Cost of ownership

None of this convergence comes free, but enterprises must consider more than dollars and cents when approach-

ing investments in convergence.

Enterprises must clearly focus on their goals for doing business in the next century. They must evaluate the processes in place, the technology they have for supporting those processes and what changes they will make in the short term and long term. In other words, planning convergent applications is no different from planning any other technology investment.

Convergence isn't all or nothing. At one end of the spectrum, enterprises can integrate interfaces and browsers to separate related applications (probably the fastest and least expensive first step to convergence). Fully integrating complex databases with customer service, human resources or production applications fall at the other end of the spectrum — sophisticated and expensive to implement. Using familiar browser technology, customer service representatives could access inventory systems, shipping databases and pricing information to provide rapid answers to customers. In the same way, employees could access their company's financial systems to manage their business units and report results.

Taking advantage of convergent technologies and solutions creates an image that the enterprise is a forward-looking one — it takes technology and runs with it — into a brave new world. This image can instill customer and employee loyalty. Customers want to be identified with efficient and modern suppliers; employees want challenging and exciting workplaces. Implementing and maintaining the new convergent applications address these points. And they pave the way for improved performance and future growth. ♦



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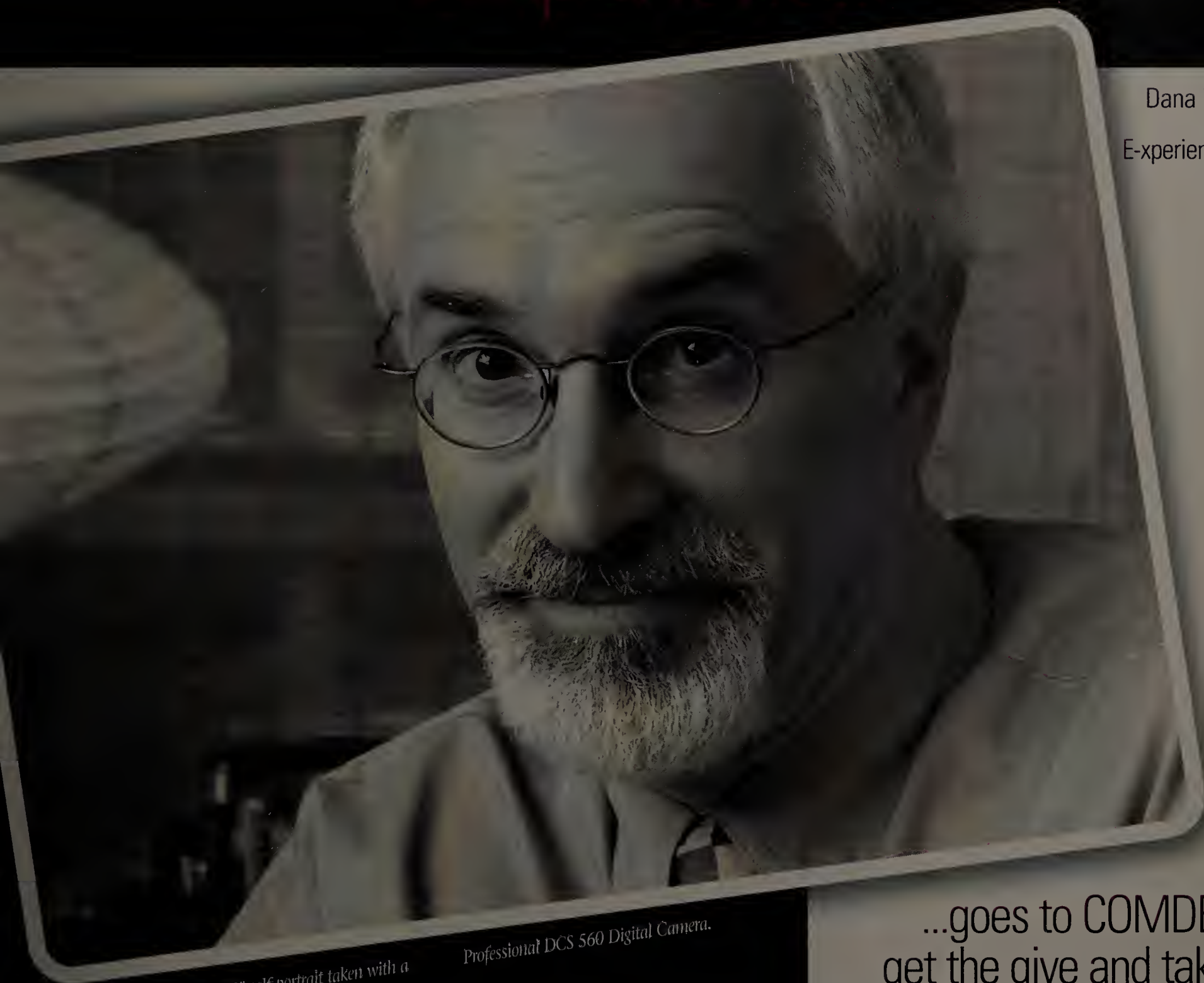


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LET'S MEET BY SATELLITE

Heavy-equipment maker Caterpillar has long been a proponent of videoconferencing. Now, new technologies, including satellite connections, may make virtual meetings more viable for a large number of companies. **► 88**

HOSTING TESTS

Compuware is one of the vendors offering software testing as a hosted service, which analysts say can be a cheaper alternative to performing the function in-house for users that aren't concerned with relinquishing control of their Web information. **► 88**

SECURITY JOURNAL

Jude says he hopes his new smart cards will solve password-security problems, but the project gets bogged down with a confusing array of hardware, software and standards options. **► 90**

HANDS ON

Put Apple's new Cube on your desk, and your image may never be the same again. It redefines both cool and classic. The Cube served our reviewer admirably, capably handling his workload — and it's quiet, too. **► 92**

BETTER VIEW OF ENTERPRISE DATA

Once the realm of scientists, data visualization

software is emerging as a serious business analysis tool for corporate information technology. The tool lets users quickly spot trends in multidimensional data through the use of 3-D graphics. **► 94**

QUICKSTUDY

With two or more CPUs in a single box, symmetrical multiprocessing (SMP) can boost your computing power — provided you have the right software. SMP is a parallel computer architecture in which multiple processors run a single copy of the operating system and share the memory and other resources of one computer. Find out more. **► 102**

EMERGING COMPANIES

Datasweep's new manufacturing-execution system is built from the ground up to support Web updates — a unique feature in this well-established market. Datasweep also boasts faster implementation, but entrenched, larger competitors are racing to meet the challenge. Can this upstart keep its edge? **► 104**

SKILLS SCOPE

Smart employers say they know they can never find enough skilled IT workers in the job market, so they're creating their own — from nontraditional backgrounds inside and outside their companies. Find out more about high-tech firms making nontechie hires. **► 106**



THANE TERRILL of Baha'i International Community is finally getting some software help for the tedious task of upgrading users with new hardware and a new operating system

MIGRATION MADE EASIER

POWERFUL TOOLS are available to simplify the job of setting up new PCs for users while preserving their customized settings and data. This new breed of enterprise utilities, called PC migration tools, is especially helpful when users are also migrating to a different operating system, such as Microsoft's Windows 2000.

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Caterpillar to Launch Satellite Videoconferencing System

Heavy-equipment company melds voice, video with latest in satellite networks

BY JAMES COPE

WHEN a large earthmover, bulldozer or other piece of heavy equipment breaks down on the other side of the world, contractors often don't have the luxury of reverting to a backup and may not have on-site engineers who can troubleshoot the problem. That's one of the reasons Caterpillar Inc. in Peoria, Ill., relies heavily on videoconferencing to bring experts together in an instant.

Now, said Caterpillar systems architect Gus Otto, the heavy-equipment maker is preparing to launch a videoconferencing system co-developed by Andover, Mass.-based PictureTel Corp. and Intel Corp. The system will be married to satellite equipment and services from Spacenet Inc. in McLean, Va., a wholly owned subsidiary of Gilat Satellite Networks Ltd. in Petah Tikva, Israel.

Otto said Caterpillar will standardize on the PictureTel 900 PC-based videoconferencing system, which runs over switched telephone systems or IP networks.

PictureTel began shipping the system in August. It is priced between \$10,000 and \$15,000 per installation, which Otto said is about one-third the cost of PictureTel's Concorde system.

The Big Picture

Otto said he hasn't always been so enthusiastic about PictureTel. The company tried to hang onto its old high-end, high-price strategy instead of embracing new technologies that would bring prices down, he said. In fact, Otto said he pretty much gave up on PictureTel and started leasing Intel's PC-based TeamStation for conference room setups at Caterpillar. TeamStation costs \$6,000 to \$9,500, depending on configuration.

Over the past year, PictureTel made a turnaround, Otto said. The company teamed up with Intel to develop the video and audio compression algorithms that make up the core of the PictureTel 900.

PictureTel is also now the exclusive distributor of Intel's videoconferencing systems as well as those developed jointly by the two companies.

Good Sound, Good Picture

Contrary to popular belief, Otto said, developing an algorithm that provides acceptable video over IP hasn't been the main problem. The issue, he said, has been achieving good audio quality with acceptable video.

The algorithms that PictureTel and Intel developed provide audio in the 14-kilohertz range, less than the 20 kilo-

hertz of CD-quality audio but still four times that of a standard telephone call.

Otto said he's excited by the prospect of coupling this latest videoconferencing technology to Spacenet's forthcoming satellite system. It's a PC-based system with a satellite dish that has both receiving and transmitting capabilities.

The low-end system, which will be available to consumers and businesses, has a downstream capability of 500K bit/sec. and an upstream capability of 153K bit/sec.

A spokeswoman at Spacenet said pricing would be based on bandwidth and service levels specified by the customer. The product will begin shipping early next year, she said.

Brownlee Thomas, a senior analyst at Giga Information Group Inc. in Cambridge, Mass., said that until now, acceptable videoconferencing required 384K bit/sec. in both directions. That translates into

three 128K bit/sec. Integrated Services Digital Network lines on each end of the connection, which can cost a company \$500 to \$600 per month.

PictureTel Vice President Ned Semonite said the new compression technology in the company's equipment could provide excellent audio and good video running over a 256K bit/sec. connection.

Otto said that in his tests, he saw acceptable results at even lower speeds. ▀



CATERPILLAR ENGINEERS will soon be able to troubleshoot problems with heavy equipment via a new satellite videoconferencing system

Compuware Introduces Remotely Hosted Software for Internet Testing Service

Users say hosted services cut time, costs

BY JULEKHA DASH

As more vendors offer Web performance testing through a hosted model, analysts say it can be a cheaper alternative to performing the function in-house as long as users don't mind relinquishing control of their Web information.

Last week, Compuware Corp. in Farmington Hills, Mich., launched PointForward, a remotely hosted Web testing service.

Hosted testing services are gaining popularity, said Billie Shea, an analyst at Newport Group Inc. in Barnstable, Mass. According to Newport Group, the market for load-testing tools and services reached \$214

million last year, an increase of 55% over 1998.

Load testing via the Internet is a faster and cheaper alternative to setting up a test lab, purchasing the hardware and hiring personnel, said PointForward beta tester Sean Moshir, CEO of PatchLink.com Corp. in Scottsdale, Ariz., an electronic-business infrastructure management software firm.

Compuware's pricing varies according to the type of testing users want, but it generally ranges from several hundred dollars per month to between \$3,000 and \$10,000 for one-time service.

Moshir said he couldn't estimate how much money he has

saved using a hosted service but noted that he has cut at least two weeks out of the testing cycle. By simulating multiple users logging on to PatchLink's Web site, Compuware measures how much traffic the site can handle and checks for bottlenecks.

Points of Interest

Compuware's PointForward tests for the following:

- Which site links are broken
- How many users the site can handle
- Performance monitoring - for example, download times

Because Web testing is an expertise that most organizations need periodically rather than all the time, it's a good alternative that companies can rent rather than purchase, he said.

Difficulty in finding people who have Web site testing expertise is another reason why hosted Web testing is gaining popularity, said Richard Heiman, an analyst at International Data Corp. in Framingham, Mass.

The skills for this kind of work include understanding how an application performs after an unexpected surge in traffic, he said.

For example, "Al Greenspan makes an announcement, and suddenly everyone wants to trade stocks in the next 10 minutes," said Heiman.

Other vendors have announced Web site testing services within the past year, including Segue Software Inc. in Lexington, Mass., and Mercury Interactive Corp. in Sunnyvale, Calif. ▀

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Smart-Card Project Off to Rough Start

Hardware, software and industry standards befuddle; parade of consultants only adds to Jude's confusion

MY WEEK has been spent mostly in the company of consultants. I seem to have had every vendor and consultant stereotype visit me since Monday: from the nervous, commission-hungry salesman to the professional, soberly suited management consultant with an encyclopedic knowledge of a very narrow area.

The subject was smart cards. As regular readers know, I'm trying to implement smart-card-based access control for Windows 2000 PCs so that I can do away with passwords wherever possible. This should be relatively simple, because Windows 2000 is designed to support smart-card access. But the project is made more complex by having to be compatible with our proximity-card building-security system.

Digging Into Smart Cards

Over the past few weeks, I've been on a steep learning curve. I've been scouring the Internet for Web sites that explain smart cards and smart-card technology. I've also been reading all the Microsoft Corp. white papers I can find. The white papers are in fact rather clear and concise, despite some occasional lapses into jargon.

From what I understand from the smart-card Web sites and the blandishments of the consultants, I have to choose the smart-card chip, the chip's operating system, the type of smart-card reader and a certification authority. From there, it's just a matter of system configuration.

I'm least sure about the type of smart-card chip I need. I have a wide choice of manufacturers, but I'm not yet sure how to distinguish among the different chips they all offer. I know the chip needs to conform to the industry

standard, ISO 7816, and I know that they offer different amounts of RAM, from 1KB to 16KB, but after that, I can't distinguish among them on anything other than cost. (Perhaps readers can enlighten me in the *Computerworld.com* Security Manager's Journal forum.)

The ISO 7816 requirement is absolutely fundamental. This is the international standard that determines the basics of how a smart card should be designed; most cards and card readers are built to this standard. If I specify a card that doesn't meet the standard, I'll have a very hard time finding other compatible systems.

Windows 2000 smart-card authentication is based on X.509v3 certificates, so I know that each card will have to hold one of these certificates. This can take up to 3KB of the available memory. After that, any remaining memory is there to be used by future applications.

Although we don't have any other applications planned for the cards yet — it's very early — I believe that smart cards are such a useful technology that many other applications will be found as soon as the technology is there. Since 16KB cards cost only about 10% more than 8KB cards, and since the card cost is going to be such a tiny fraction of the cost of the whole project, it makes sense to go for the largest possible cards right from the start.

The card operating system is an easier decision — particularly because there seem to be only four real choices: Sun Microsystems Inc.'s JavaCard, London-based Maosco Ltd.'s Multos, Microsoft's Windows for Smart Cards or a proprietary operating system.

I want this system to be as flexible as possible so it can be used easily for new smart-card-based systems as they arise. Therefore, I want to avoid proprietary

operating systems wherever possible.

Multos seems to be the highest-security operating system, most commonly used in retail financial systems such as payment cards.

I'm not sure about JavaCard yet, and I haven't found anyone with a well-researched opinion on it. Windows for Smart Cards is young and relatively untested. However, knowing Microsoft, by the time I'm ready to roll it out in nine months, it will be like any other Microsoft operating system — not pretty, not very elegant, but functional, popular and capable of working with almost anything else on the market.

The User Triumvirate

Smart-card readers are turning out to be a bigger problem than I imagined. We have three main types of users: the average paper pushers (that's me!) with a relatively standard desktop PC, keyboard and monitor; the road warriors, who take their laptops wherever they go; and the front-line operations staffers, who are highly stressed, highly demanding and have very specialized hardware and software configurations.

That means we need three different types of readers. Paper pushers can use almost anything that fits in the back of their PCs. Road warriors need something light, unobtrusive and easy to use. Operations staffers need a reader that can take some punishment and can fit into their often unusual environments.

I put these requirements to every consultant I met, but I got incomplete answers at best. One finally suggested a French company called Gemplus SA. Gemplus seems to have products that meet most of these requirements. I've had time only for a brief call to one of the company's salesmen, but he was impressively calm and well-informed and came up with simple, helpful answers to all my questions. The impression I got was that people at Gemplus had seen these problems before and solved them. I'll have to investigate further.

The certification authority might be the hardest requirement of all because it will involve the most office politics.

As I mentioned above, Windows 2000 authentication is based on digital certificates. A digital certificate essentially consists of two things: the public key of an asymmetric cryptographic

THISWEEK'S GLOSSARY

ISO 7816: The International Standards Organization's (ISO) published standards for the design and manufacture of smart cards. Although ISO standards aren't enforced, vendors wishing to interoperate with other companies in the smart-card marketplace usually comply with this standard.

X.509v3 certificates: This refers to the international standard Directory Authentication Framework (ISO/IEC 9594-8, or ITU-T X.509). This standard describes an authentication protocol based on public-key cryptography and using digital certificates. The name X.509v3 is commonly used to denote digital certificates that comply with this standard.

LINKS:

www.smartcardcentral.com/directory: Smartcardcentral.com Inc.'s online buyer's guide to smart-card industry vendors is an excellent resource. It includes links to vendor Web sites, names of consultants, reports about smart cards and smart-card technology and even a list of trade shows.

<http://java.sun.com/products/javacard>: Sun's JavaCard Web page contains detailed technical product information, white papers and developer information.

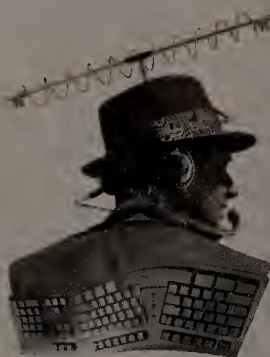
www.multos.com: The Multos site is operated by Maosco Ltd., a consortium that develops Multos and backs it as an industry smart-card standard for financial and retail applications.

www.microsoft.com/windowsce/smartcard/default.asp: Microsoft Corp.'s Windows for Smart Cards Web page includes a tutorial, tool kit data sheets, white papers and other data.

www.gemplus.com: Gemplus SA's Web site includes both smart-card product information and a tutorial.

key pair and a statement from a trustworthy source that the corresponding private key — the other half of the key pair — is known to one person only. This asymmetric cryptographic key pair consists of two keys; one public, one private. Anything encrypted with the public key can be decrypted only by using the corresponding private key, and vice versa.

In our situation, that trustworthy source is known as a certification authority. And it isn't easy to create something worthy of so much trust. ▀



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As the Macintosh once did,
Apple's new Cube redefines what
a computer can look like – without
sacrificing performance.

By Tom Thompson

Clearly, A Computer



IT SITS THERE QUIETLY in my office, looking like no other computer I've ever seen. A silvery cube, 8-in. to each side, rests inside a clear plastic column almost 10-in. tall. On top are two slots and an elliptical grate plus a power-on light that glows pearly white beneath the plastic. The gray apple on one side tells the story: This is Apple Computer Inc.'s G4 Cube. All the connecting ports are located on the Cube's bottom. A small cutout in back lets you snake cables from the Cube to the speakers, your display and any peripherals.

The review system came with the base 64MB of RAM, a 20GB hard drive and Mac OS 9.0.4. Apple also included its 15-in. LCD display, with a resolution of 1,024-by-768 pixels, that connects to the Cube via a single proprietary cable that carries power, digital video and Universal Serial Bus (USB) signals. The display has two USB ports on the back intended for the keyboard and speakers.

The LCD panel is absolutely gorgeous, with crisp images as bright as those of a CRT monitor and a wide 160-degree viewing angle. I had the display next to a window, and even with the afternoon sun on it, the screen

was bright and easy to read.

To put the system to sleep, you simply tap the screen's glowing power-on indicator. To wake it, tap the indicator again.

The machine comes with two softball-shaped Harmon Kardon speakers connected to a transparent digital-audio module that plugs in to a USB port. The module has a jack for stereo headphones. Audio CDs and MP3 files sounded great on the high-quality speakers, and computer games had new impact with the stereo sound.

I played several DVDs in the system. You simply stick a disc into the front-most slot, and a motor pulls it into the Cube. When you are finished, push the new Eject key on the keyboard and the DVD pops up like a slice of toast. The DVD video looked great and was well-matched with the stereo sound.

However, any other use of the system caused the video to stall momentarily. While this design certainly shows off the G4's computing prowess and eliminates a part, it makes for a lot of processing by the CPU.

I connected the Cube's Ethernet port to a 3Com Corp. hub/Integrated Services Digital Network LAN modem and was on the Internet in minutes. I had a few minor difficulties because of application incompatibilities with Mac OS 9. For example, I had to upgrade to Adobe Acrobat 4, and I had to apply a Mac OS 9 compatibility patch for Microsoft Office 98.

My one gripe here is the 64MB of RAM. Because Mac OS 9 consumes about half of that, you're going to have problems running more than one or two moderate-size applications. If you get a Cube, get more RAM.

As I mentioned, most Internet programs worked fine, being routed via Ethernet to a 3Com hub. The built-in modem is compatible with Boca Raton, Fla.-based Global Village Communication Inc.'s GlobalFax 2.6.9 fax software.

Expandability
Surprisingly, this sophisticated design doesn't sacrifice access to key internal components. You can add more memory or Apple's AirPort wireless network card and exchange the hard drive yourself. Just turn the Cube off, turn it over and press on a recessed slat that pops out and becomes a handle to lift the computer core out of the column, exposing the Dual Inline Memory Module sockets, AirPort slot and hard drive. Slide the core back into the tower and press the handle in until it clicks, and you're done.

The Cube lacks expansion slots, but most people will only add memory or replace a hard drive. Also, heat's a factor. The Cube is convection cooled, and more peripherals would mean more heat. If you need expansion boards, buy a G4 tower instead. A 400-MHz G4 tower, ironically, costs \$200 less than a baseline Cube.

The Cube served admirably as an industrial-strength computer, capably handling my workload. And it's quiet too: The only noise is a faint chuckle when accessing the hard drive; Apple has measured this level at 19 decibels, which is comparable to a very quiet living room. This makes it ideal for the home or small office where space and noise are important.

Let's face it: The Cube looks cool. Except for the LCD panel, the hardware isn't a great technical achievement, but its svelte size and sleek design make it look like a computer for the millennium. And this was achieved without compromising performance or the user's ability to upgrade the machine.

Clearly (no pun intended), Apple is also attacking the TV/computer media convergence from the computer side, because the Cube makes a superb entertainment system as well as a capable graphics computer, especially with its terrific screen. ▀

Thompson is a training specialist at Metrowerks Inc. in Hollis, N.H.

Pros:

- Looks cool.
- Superb stereo sound system.
- Excellent LCD display.

Cons:

- Base 64MB isn't adequate.
- DVD decoding done in software rather than hardware.
- It's pricey compared with the standard tower model.

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Data visualization tools catch on for business analysis.

By Steve Ulfelder

IF YOU'RE A CLIENT of Deltek Systems Inc. and your account is in arrears, be aware that when the company managers and directors meet, your name shows up on a computer screen in big red letters.

This sounds primitive, but like many businesses, Deltek, a McLean, Va.-based professional services automation company, is just scratching the surface when it comes to data visualization. The technology, rooted in scientific applications, is now being merged with statistical analysis software. The goal is to replace reports and tables with powerful, eye-catching images that convey important statistical data to even casual users.

Users of the technology rave about its ability to help businesspeople quickly grasp huge quantities of data, and experts say data visualization will quickly be merged into standard data analysis tools. But users complain that visualization products still have a ways to go where ease of use is concerned.

Until recently, most corporate information technology managers viewed data visualization technology as a toy for scientists or as a nice business tool that couldn't find mainstream traction. But experts say that's finally changing, for three reasons.

First, computer power has finally caught up with the technology. "A few years ago, you needed a \$20,000 Silicon Graphics workstation to use visualization," says Don Campbell, Ottawa-based Cognos Inc.'s vice president of information delivery products. But that isn't the case anymore; new tools can run on desktops in a typical corporate environment, he says.

Second, the demand for business data is fearsome — and it's growing all the time. Even the most hard-core bean counters, born in Lotus 1-2-3 and raised on Excel, must work hard to pull the significant or potentially threatening numbers from spreadsheets. Data visualization makes those numbers impossible to miss and easy to grasp by everyone.

"These types of tools can help you more quickly adjust your mind and pinpoint information without having to interpret it," says Bob Moran, an analyst at Boston-based Aberdeen Group Inc. "It helps you see relationships by looking at a chart."

This is a vital point. Experts say data visualization software's ability to accentuate the relationships among data points is one of its major benefits. Moreover, e-commerce has put a premium on real-time data. In some sectors, it's critical to keep an eye on your own site traffic and your competitors' in order to see who's winning, what promotions are working, where the traffic's coming from and so on.

Data visualization makes this possible. Rather than having to wait for reports or compare sterile columns of numbers, it's now possible to use a browser interface to gaze in real time at your vital e-business numbers.

The final and perhaps most significant reason for data visualization's growth spurt is that vendors with deep roots in data analysis software — including Cognos, Naperville, Ill.-based Visual Insights and SPSS Inc. in Chicago — are building the technology into their product lines.

Keith Gile, an analyst at Cambridge, Mass.-based Giga Information Group Inc., says that just as data mining has faded into the background as a stand-alone discipline but is more widely used than ever as the backbone of customer relationship management applications, data visualization will be folded in as the expected interface for statistical-analysis software.

From Analysis to Synthesis

Deltek uses Cognos' Visualizer 1.5 to synthesize analyses gleaned from other Cognos tools into an easy-to-understand presentation. "It lets us learn which projects are most profitable [and] which regions have the highest concentration of clients," says Shimi Minhas, Deltek's director of business intelligence. "You can immediately ID those hot spots, then drill down to the detail."

Deltek has used Visualizer for about six months, Minhas says. Because the company is a longtime user of Cognos' data analysis tools, Deltek didn't consider competing vendors' products. Regional and project managers liked stepping up from spreadsheets and reports because "they say they can make faster decisions," Minhas says.

Paid-up accounts appear in green, 30-day accounts in yellow and delinquent in red. "In looking at a Visualizer [presentation] of accounts receivable balances, we can quickly ID which clients are not up-to-date," Minhas says.

Although Deltek is happy with Visualizer, Minhas says, it can be difficult to understand for end users unaccustomed to other Cognos products. In addition to such Cognos data analysis products as PowerPlay and relational database management systems supported by the vendor's Impromptu, Visualizer supports flat files

and Excel files as data sources.

Visual Insights seems to be emulating Cognos' model. Founded in Bell Labs as a research project, Visual Insights started as a tools company but is fleshing out its product line, according to Michael Tatelman, vice president of marketing and business development. "We're now an analytic applications company using visualiza-

tion as a core differentiator," he says.

Moran says he agrees that Visual Insights is "moving into analytic tools very quickly."

Houston-based energy company Enron Corp. found that risk management was a natural application for data visualization. "Risk management involves complex mathematical principals, and the results are not intuitive," says Rudi

Envisio

DATA VISUALIZATION SOFTWARE lets users quickly pull raw data from spreadsheets and other sources and plot it in a 3-D graphical landscape for further analysis and interpretation. Here, a candy maker attacks a sudden inventory spike pinpointed in Cognos' Visualizer. The user has combined chewing gum inventory values (Z axis) from all plants and sorted the inventory data by month (X axis) and flavor (Y axis) to pinpoint the exact source of the problem. Aggregate dollar values of all gum by month appear in the shadow graph in the background. The user now suspects a seasonality factor with several flavors and begins a drill-down analysis in this area.

	A	B
1	Date	Closing Value
2	199801	15570013
3	199802	16167914
4	199803	37683979
5	199804	77608803
6	199805	2.58E+08
7	199806	7.00E+08
8	199807	1.15E+09
9	199808	1.25E+09
10	199809	8.03E+08
11	199810	92906519
12	199811	15080694
13	199812	7540715.5
14	199901	18879488
15	199902	47964824
16	199903	82925048

Aggregate dollar values of all gum by month

	A	B	C	D
1	Date	BubbleBurst G	BubbleBurst G	BubbleBurst G
2	199801	64918.2	141753.26	791035.6
3	199802	67539.6	141753.26	806856.8
4	199803	168849	326064.6	1775457.6
5	199804	422148.2	749994.44	3947168.8
6	199805	1899692.6	3225012.8	13341906
7	199806	8548642.4	8823005.4	30772026
8	199807	47017533	37236027	49024840
9	199808	35263176	28156389	55586646
10	199809	14105291	11629454	35586710
11	199810	564217.8	832129.7	4620632.4
12	199811	112874.4	166471.8	924224
13	199812	56437.2	83235.9	462146
14	199901	129836.4	241452.9	1184616.8
15	199902	298634	700282.2	3059400.8
16	199903	421094.5	1163743.4	5679782.4

Y AXIS: Gum flavors

Z AXIS: Gum inventory dollar values

X AXIS: Months

Zipter, Enron's director of market risk management. Enron develops energy and bandwidth portfolios, which it then trades like commodities. "We like to analyze and decompose risk across the portfolios," Zipter says.

Zipter's department started using Visual Insights' Advizor/2000 late last year. He says it "results in a keener insight of risk" because it "allows you

to see where risk is coming from." Recently, the risk management department was certain that the risk in a certain portfolio was coming from one source. But, he says, "by putting traders' portfolios in a 3-D visualization, we could see right away" that they had misidentified the problem area.

Advizor/2000 accepts standard Ex-

cel tables as input. It also accepts on-line analytical processing "cubes" — structures that store multidimensional information — that are created in Microsoft Corp.'s SQL Server 7.

Zipter does have a few suggestions for improvements to Advizor/2000. He says the flexibility built into the product brings an almost overwhelming number of possibilities when Enron develops applications. "And there's not a lot of documentation," he adds, "so it's learn as you go."

A More Granular Approach

Another data analysis heavyweight, SPSS, offers nVizn, a Java-based developer's tool kit that lets businesses create their own visualization applications.

The advantage of the development-tool approach is its flexibility. SPSS's Dan Rope, nVizn's chief architect, mentions its "granularity" when discussing the absolute control developers can hold over their presentations. "The developer then uses his knowledge of the [specific business] domain" to make data do exactly what he wants it to do, Rope says.

Waratah Corp., a Durham, N.C.-based firm that provides software development and data mining services to the health care industry, chose nVizn when Health Hero Network Inc. in Mountain View, Calif., asked it to create an information visualization component for Health Hero's Web-based patient care management system.

According to Michael O'Connell, Waratah's president, patients at home answer a series of questions about their health on a daily basis. That data is then used to build a 3-D visual representation that makes it easy for health care professionals to monitor patients' health on an ongoing basis.

The SPSS visualization is superior to simple charts, O'Connell says, because "you're able to see trends in information across time with metadata — that's much more powerful." Danger signals such as weight fluctuations raise a red flag, triggering an intervention, he explains.

The trade-off for such granular control may be added complexity. SPSS officials say it typically requires a team of three to create a custom visualization application with nVizn:

a "domain expert" (in the health care example, this might be a doctor), a developer and an analytics expert.

So while Cognos and Visual Insights are attempting to build front-to-back data analysis suites that feature a visualization interface, SPSS is selling a do-it-yourself kit that requires a more significant development effort up front but can potentially pay off with supercustomized presentations that better fit an organization's data and business.

While the business case for visualization tools is powerful, vendors have their work cut out for them. Their push today is to overcome visualization's reputation as a high-maintenance tool for scientists and to get software into the hands of subject-matter experts — the people who can best use them. Tatelman says he believes the trickle-down of visualization software will mimic that of desktop publishing tools.

Judging from interviews with users, however, vendors must first make data visualization software more intuitive and easier to use. Right now, users appear overwhelmed by visualization's unlimited possibilities. But they always get through this stage with new technologies, and what was initially intimidating quickly becomes well understood.

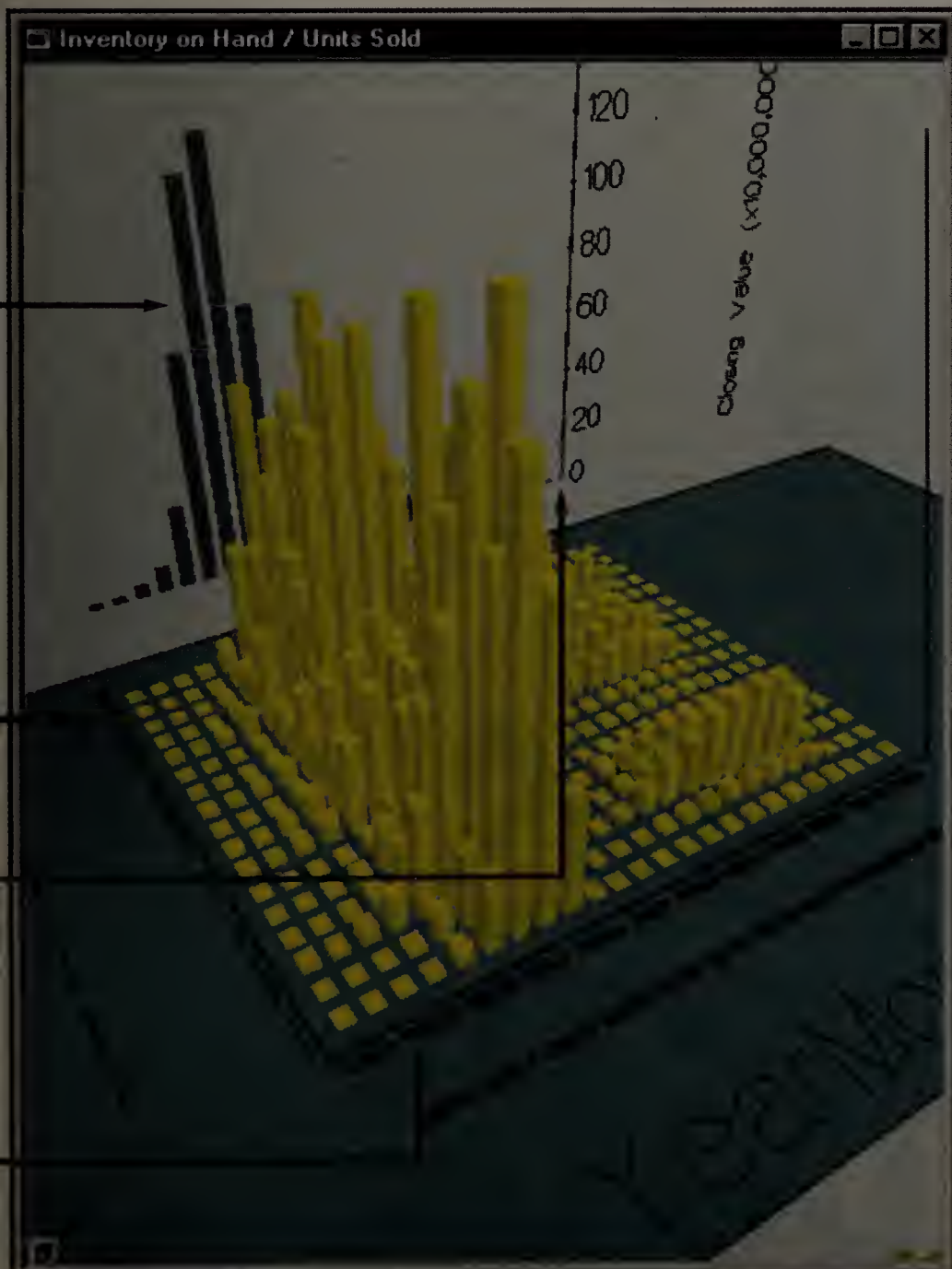
"That's a natural part of [any new technology's] evolution," Gile says. "Business intelligence software has always been focused at the power user. Everybody's got to see a real neat visualization app before it catches on."

It's critical that products become easier to use and to populate with data. One major problem for IT is that data visualization tools have always been parasitic by nature — that is, they've taken data from existing programs such as spreadsheets and pretied it up.

End users saw the results and often demanded visualization tools of their own. But where was the data going to come from? That was IT's problem. Now the melding of analysis tools and visualization appears to be addressing that issue as well. ▀

Ulfelder is a freelance writer in South-boro, Mass.

on This



Visualization Tools

VISUALIZER 1.5

Cognos Inc.
Ottawa
\$795 per client; site
license available
www.cognos.com

ADVIZOR/2000

Visual Insights
Naperville, Ill.
\$295 per user
www.visualinsights.com

nVIZN

SPSS Inc.
Chicago
\$10,000 per developer
seat plus deployment
license; price varies
with deployment size
www.spss.com

WHEN THANE TERRILL, network administrator at Baha'i International Community, finally found a utility to automate an operating system migration, it cut the two- to three-hour process down to one hour.

The problem: When an enterprise replaces a user's computer or upgrades to a different operating system such as Windows 2000, it's likely to lose a lot of productivity while that user attempts to re-create on the new system — whether on his own or with help desk support — his previous working environment of desktop settings, data files, utilities and personalized settings. By David Essex

COMPUTERS DON'T LAST FOREVER. Many enterprises routinely upgrade or replace PCs every two to three years, which means information technology staffs must handle hundreds or thousands of replacements annually. Each replacement involves a certain amount of work for IT, as well as some disruption for users. If you're also upgrading to a new operating system such as Windows 2000, along with newer versions of core applications, then the problems can increase dramatically. IT needs help, and a new class of software tools has emerged to supply it.

If you've ever set up a new PC, you know how tedious a task it can be. You have to install applications that aren't preloaded and then alter their factory-default configurations to match your working environment. You have to back up data, of course, and also desktop settings, Internet favorites or bookmarks, e-mail configurations, dial-up and remote access configurations and more.

This data is located in different places on a PC — some inside program files, some in configuration files and some

Migration Tools Ease New OS Blues

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Migration Tools Ease New OS Blues

in the Windows registry — and there's no simple way of making sure you have everything you need or want. If you're also upgrading to a significantly different operating system (say, Windows 9x to Windows NT or 2000) or to newer applications (such as from Office 97 to Office 2000), then the problems are compounded.

The IT department may be charged with setting up a user's machine, but if all it does is install a standard disk image and configure the network settings and e-mail connections, the user may have a lot of work ahead of him until the new system functions as the old one did. *[Note: As Computerworld's reviews editor, I deal with 20 to 30 new systems, mainly laptops, each year. I'm painfully familiar with the work needed to re-establish my own working environment on a new machine. — Russell Kay]*

This problem isn't new, but it's gotten worse as software has become more complex. A major factor is the oft-delayed and much feared migration to Microsoft Corp.'s Windows 2000 Professional desktop operating system. A new breed of enterprise utilities, called PC migration tools, seeks to automate the manual labor of getting users onto new PCs without having to tediously reconstruct the passwords, user identities, screen settings, IP addresses and documents. Researchers at Gartner Group Inc. in Stamford, Conn., and International Data Corp. (IDC) in Framingham, Mass., say they agree that a smooth migration can knock \$200 to \$300 off a PC's total cost of ownership.

PC migration isn't just a matter of transplanting PC "personalities." It also requires a quick way to get new operating systems and applications onto systems, or applications onto new hardware. Disk-mirroring or -imaging tools — Cupertino, Calif.-based

Symantec Corp.'s Ghost is the de facto standard — are often used to lay down a standard set of applications before the user settings are brought over. But because of compatibility problems, migration tools only support a few mainstream office programs, handling less-popular applications through checklists and scripting languages that can be harder to use.

Computerworld asked users of three well-known migration packages to describe their experiences and informally rate the products for ease of setup and use, reliability, feature sets and performance.

Avoiding a Software Meltdown

Michael Phillips, supervisor of the computer support team at the Diablo Canyon Nuclear Power Plant in San Luis Obispo, Calif., recalls the way his group used to handle migrations. With the DOS XCOPY command, special scripts initiated backups to network drives. Shrink-wrapped backup software didn't help much because it didn't automate restoration. Each system took up to six hours of a technician's time.

Now, to move about 1,000 of the plant's 1,500 workstations to Windows 2000 and Office 2000, Phillips has help from Altiris eXpress, a software bundle from Altiris Inc. in Lindon, Utah. The bundle includes PC Transplant Pro personality software, a mirroring and configuration tool called RapiDeploy, and RapidInstall, which simplifies upgrades by recording changes on a single machine and then creating special RapidInstall Packages (RIP) that users execute on their own systems.

Phillips says he picked eXpress because it came with the other utilities needed to perform a full migration, rather than requiring third-party mirroring tools. He says he also liked eXpress' ability to randomly reset security identities on cloned NT systems.

So far, Phillips' group has migrated 300 systems, each in a little more than an hour. He says he chose not to use the package's discovery features, preferring to use an existing process of simple utilities and a manual system in which users are responsible for reporting their systems' contents. "We didn't feel [eXpress] would give us all the information that we need," Phillips says.

Settings in Microsoft Outlook had to be changed manually, and there were problems in moving from Microsoft Exchange to Outlook: Calendars were improperly merged, and Phillips says he isn't sure which product is to blame. EXpress also doesn't work with the plant's Unix-based server boot-up utility, but Altiris has promised to fix that in a future release.

Phillips says eXpress' ease of setup and use are good. "It seems like it's been pretty easy to train our people on," he says. Feature richness and reliability are also good, he says, but he rates performance a bit higher, thanks to the fast execution of RIPs. Though Phillips gives eXpress generally good marks, he remains somewhat guarded in his evaluation. "I'd say the verdict is still out on the product," he says.

For Michael Santiago, migration tools don't just reduce labor; they also help smooth out and simplify the entire process. As a network engineer at the Army Space Program Office outside Fort Belvoir in Alexandria, Va., Santiago is one of two people who must move a completely mobile, 120-user workforce from older Gateway Inc. notebooks with Windows 95 to new Pentium III Gateway 2550s with Windows 2000. Santiago started using Desktop DNA from Miramar Systems Inc. in Santa Barbara, Calif., last month, migrating users at a rate of six per week.

The old method depended on kludgy backups and could take several hours or days. Further productive

Continued on page 101



“They sounded like I was asking about the man on the moon.”

That's the help that Thane Terrill (left), network administrator at the Baha'i International Community, says he used to get from utility vendors when he asked for help in migrating user settings. So he'd muddle through with Windows Notepad, a printed checklist and a few specialized utilities. **“It was really a hit-or-miss thing.”**

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Migration Tools Ease New OS Blues

Continued from page 98

time was lost coordinating the work with users' availability to bring systems in for servicing. "We needed to make sure when they got their new laptops it wasn't much of a change for them," Santiago says.

Now, everything runs more tightly. "It'll take about an hour to transfer data to the server and another hour or less to download it back to the new box," he says. "The only monitoring I do is I come back once in a while to see what stages it's in."

Santiago says he considered using Altiris eXpress but decided it was less intuitive than Desktop DNA. "I don't have a whole lot of time," he says. "I was looking for something that was quick and easy and would do what I needed, and this seemed to fit the bill." He says he likes that Desktop DNA lets him run backup and mirroring from the within the same user interface.

Santiago rates Desktop DNA as excellent in ease of use, setup, reliability and performance but rates the features as only "good" because there are too many of them to easily manage. "You'd like to get rid of some screens," he says. "It's not flawless."

He also encountered problems with settings in Microsoft Outlook and Outlook Express. A Desktop DNA screen that lets administrators migrate programs along with user settings could allow someone to accidentally replace newer applications on the target system. "If you're not careful, you'll overwrite your Office 2000 [Dynamic Link Libraries] with Office 97's," Santiago says.

Santiago acknowledges that such a move would be user error but faults the designers for making the mistake more likely to occur. "What they should do is not have it autoselected at the beginning," he says.

On balance, Santiago says, he likes Desktop DNA and is considering using it for a migration from NT to Windows 2000 that's planned for another user group.

Peaceful Transitions

Thane Terrill says he has long wanted a utility to automate migration. As network administrator at the Baha'i International Community in New York, an organization that represents the Baha'i Faith, Terrill single-handedly maintains about 20 Windows NT 4 systems for Baha'i staffers, many of whom sit on United Nations committees. An additional 20 Windows NT machines are used by guests and volunteers.

Terrill called utility vendors whose products he was already using, such as Symantec and PowerQuest Corp. in Orem, Utah, asking for migration tools. "They sounded like I was asking about the man on the moon," Terrill says. So he muddled through with Windows Notepad, a printed checklist and a few specialized utilities, including one that carried over bookmarks from Web browsers. He exported Microsoft Outlook files to network drives. "It was really a hit-or-miss thing," he recalls.

Now, Terrill is using Beaverton, Ore.-based Tranxition Corp.'s Personality Transport Professional 1.0 (PT Pro) to move approximately 20 users from Microsoft Office 97 to Office 2000. He also uses PowerQuest's DriveImage Pro to put a standard application imprint on the PCs, most of which come from Dell Computer Corp.

The process has been cut from two to three hours

to one hour, though Terrill still must sit at each machine to run the software and choose items on checklists that determine which data gets temporarily saved on the network. So far, installing the software and extracting settings and applications, moving them to a network drive and then reinserting them has been smooth and painless. Terrill says PT Pro moves about 90% of what he needs, though it has trouble moving Internet Message Access Protocol (IMAP) settings from Outlook 98. He had upgraded from Outlook 97 to get the IMAP features.

Terrill adds that he would like to have the option of moving cookies, a feature Tranxition left out of Version 1.0 for security reasons. He says more granularity in the checklist would allow the exclusion of sent e-mail from migrations. All three features are promised in the next version, which started beta testing in late summer. Terrill rates the performance, reliability and setup of PT Pro as excellent and the breadth and depth of features as good, since he had to ask for features to be added in the next version. A Windows 2000 upgrade is inevitable but not imminent; Terrill says he sees few compelling benefits in the newer operating system.

By one estimate, PT Pro could save the U.S. Internal Revenue Service as much as \$29 million in that agency's effort to standardize 130,000 PCs on Windows NT 4 and Office 2000 in 54 locations, in preparation for a later move to Windows 2000. "What we're doing is ensuring that our environment is standardized," says Tom Hoffmann, director of the IRS's end-user computing support division in Dallas. "You need to do that to be able to go to Windows 2000."

According to Hoffmann, some IRS offices had been writing scripts to handle migrations to the 75,000 new systems installed last year as part of a modernization contract with Computer Sciences Corp. in El Segundo, Calif. The process previously took more than three hours per machine, but it could fall to 15 to 20 minutes for new systems that already have the applications mirrored on them. The IRS primarily uses Symantec's Ghost for this task, he says.

Though most key tax-related programs run on mainframes, users' standard PC applications are also important. Besides NT 4 and Office 2000, the IRS uses Microsoft Internet Explorer, Adobe Acrobat Reader and Attachmate Corp.'s InfoConnect communications software for mainframe access. Hoffmann says it's important to retain certain features such as Web bookmarks and large-type screen fonts for the vision-impaired.

The IRS expects to start using PT Pro next month after testing "to make sure it works as the shrink-wrap says it does," Hoffmann says. "I didn't get the impression that there was anything [we] wanted to do that they couldn't do. The technical people that we have involved are extremely critical. There was not one negative comment about the tool." He says he hopes to finish the migration by the end of June next year.

"We believe this will make us more efficient" by avoiding employee downtime, Hoffmann says. "Before, the user had to start [configuration] all over again."

These aren't the only products available to assist in system migration, but they seem to address more of the many tasks involved than other utilities or tool suites do. It's hard to compare one directly with another because each takes a slightly different approach to what settings it transfers and how it operates. An IT department's choice may well depend on how well a specific tool meshes with the enterprise's environment and way of working. ▀

Essex is a freelance writer in Antrim, N.H.

THE PLAYERS	
Desktop DNA 2.0	Miramar Systems Inc. \$245 for five users (volume pricing available) www.miramarsystems.com
Altiris eXpress 4.1* <small>*Including PC Transport Pro, Rep/Deploy and Rep/Install</small>	Altiris Inc. Starts at \$450 for 10 nodes www.altiris.com
Personality Tranxport Professional 1.0	Tranxition Corp. Starts at \$275 for five users (\$129 per single user also available) www.tranxition.com

Symmetrical Multiprocessing

BY JAN MATLIS

SYMMETRICAL multiprocessing (SMP), a type of computing that uses more than a single processor, rests at one end of a continuum running from the tongue-twister Cache-Coherent Non-Uniform Memory Architecture (ccNUMA) to the less tightly coupled massively parallel processor systems and on to distributed systems such as Beowulfs, which are clusters of commodity, off-the-shelf PCs that are interconnected with a technology like Ethernet and run programs written for parallel processing.

Ironically, both the strength (speed) and weakness (lack of scalability) of SMP come from its most salient feature: shared memory. On the plus side, there's no need for message passing, and there are rarely unequal memory fetches, allowing SMP systems to communicate and synchronize more quickly than other parallel-processing systems. Note the qualifier *rarely*; there is one resource that isn't shared. In most SMP systems, each processor has its own cache memory. This more expensive static RAM is required because main dynamic RAM access is too slow to keep up with the speed of the processors.

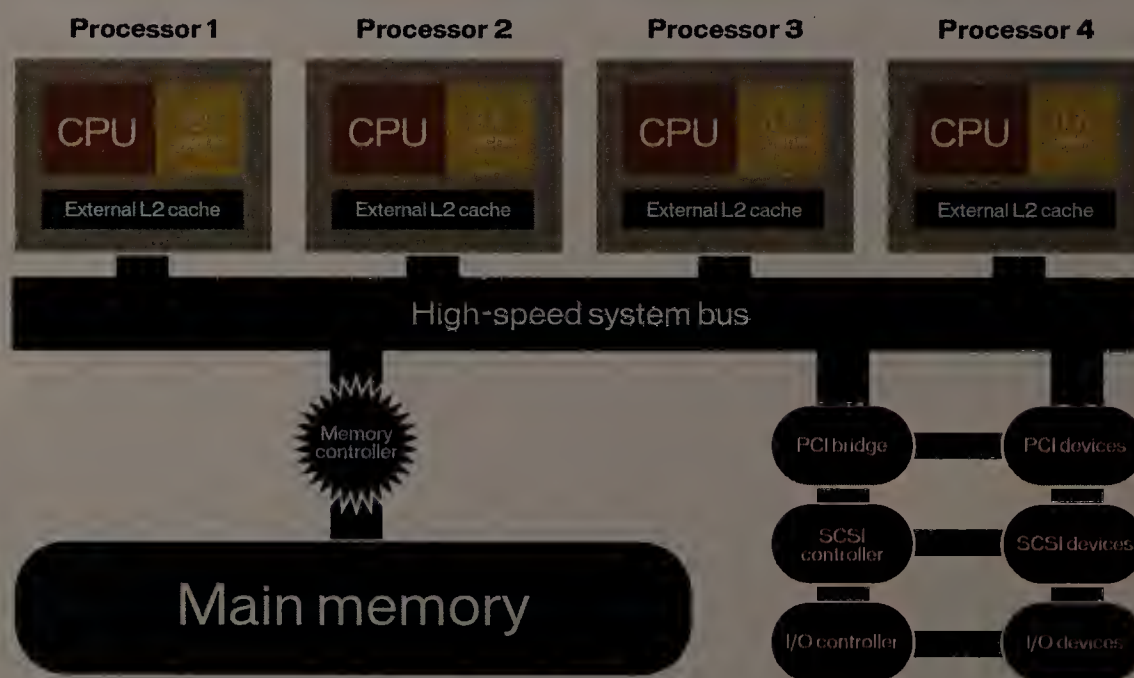
This, however, leads to a cache coherency problem when an SMP processor needs to access an address that may already be stored in another processor's cache. The problem is solved in hardware. The desired address comes from the other processor's cache, rather than from main memory, and the value in the originating cache is invalidated.

Although this solution is fast, it still generates more overhead than that of a single-processor system, which is one

DEFINITION

Symmetrical multiprocessing (SMP) is a parallel computer architecture in which multiple processors run a single copy of the operating system and share the memory and other resources of one computer. All the processors have equal access to memory, I/O and external interrupts.

Four-Processor SMP Computer System



reason the throughput of SMP systems isn't proportionally greater than that of single-processor systems. That is, the throughput of two processors is less than twice the throughput of a single processor, and the throughput of four processors is less than twice that of two processors.

For a limited number of processors, SMP still beats out the overhead required by other parallel architectures, making it the front-runner for applica-

tions that require a high degree of cooperation.

Shared memory also has an impact on coding. While there is no need to pass data among processors, it is necessary to avoid race conditions, in which the last processor to access and write out a data value overwrites the work of the other processors. There is a limit to how many SMP processors may share the operating system and the resources of a computer before memory

and bus contention impose a law of diminishing returns: The upper bound for ordinary desktop SMP systems appears to be about eight processors. High-end SMP systems and modified SMP systems like ccNUMA are more scalable.

Essentially, ccNUMA systems are SMP systems that are broken into memory domains, with some memory less local than for pure SMP. For applications that aren't tightly coupled and naturally fall into

domains, this may be perfect. Higher-end ccNUMA systems have been made to scale to as many as 64 nodes, with 128 processors. However, SMP systems aren't fault tolerant. If one processor goes down, cache coherency for the operating system and the user application are no longer guaranteed. It's likely that system and user variables are left in an unresolved state. There may be pointers with values that have no meaning. Eventually, one of the remaining nodes is likely to access something that will cause it to crash.

A combination of an operating system, a motherboard and processors must be configured to run SMP. In software, SMP is supported by most varieties of Unix, Linux 2.0 and above, Mac OS 9, OS/2 Warp Server, Windows NT and Windows 2000. It isn't supported by MS-DOS, Windows 95 or Windows 98. Threaded applications that can take advantage of SMP include Microsoft Corp.'s BackOffice Suite, Lotus Notes and SQL database managers from Oracle Corp., Sybase Inc. and Informix Corp.

On the hardware side, SMP can be implemented in UltraSPARC, SPARCserver, Alpha and PowerPC architectures, and also by all Intel chips, including 486s and above.

Because Intel owns the Advanced Programmable Interrupt Controller (APIC) standard that's used for SMP, other CPU vendors, including Taipei, Taiwan-based Via Technologies Inc. and Sunnyvale, Calif.-based Advanced Micro Devices Inc., can't use it. Instead, they support the non-proprietary OpenPIC standard for Via's Cyrix 6x86 and AMD's K6 processors. ▀

Matlis is a freelance writer in Newton, Mass.

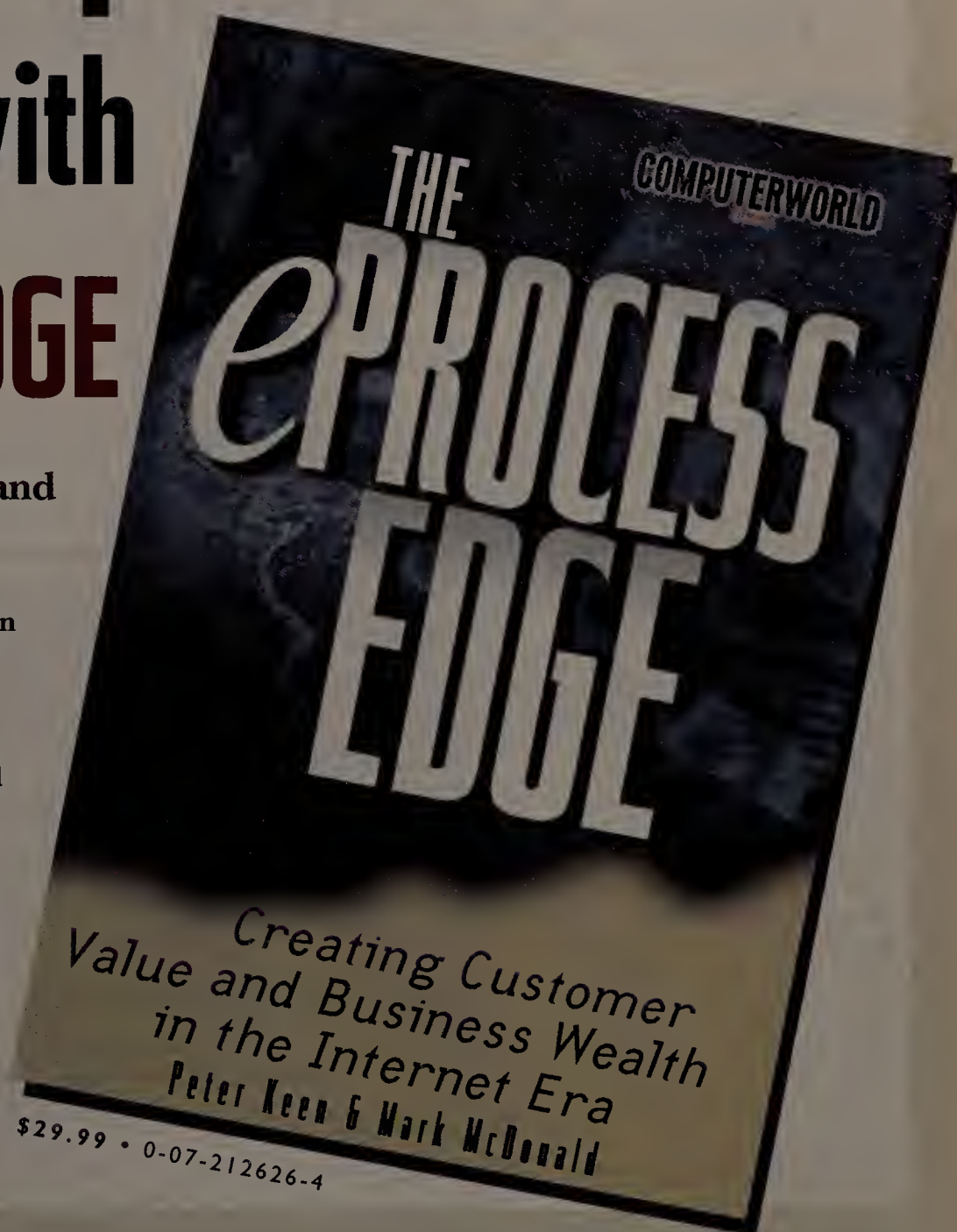
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Peter Keen advises leading-edge eCommerce companies. In addition, he has taught at Harvard, MIT, and Stanford Universities. In 1994, he was profiled by *Forbes* magazine as "the consultant from Paradise."

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The Assembly Line Gets a Web Interface

Start-up Datasweep makes manufacturing info updates available on the Internet

BY AMY HELEN JOHNSON

THE U.S. Food and Drug Administration likes to know what parts and processes are used to assemble medical equipment. This lays a big record-keeping burden on Intuitive Surgical Inc., a Mountain View, Calif.-based manufacturer of surgical robots.

The company collects a lot of information during assembly, says Don Chamberlain, a senior analyst. But, he adds, the company was writing it on paper. Faced with the need to make that information more accessible, Intuitive Surgical turned to Datasweep Inc., a vendor of manufacturing execution systems (MES).

Datasweep's sole product, Datasweep Advantage, is a Web-enabled application suite written in Java that puts PCs on the manufacturing line, where assembly operators type or swipe bar codes to enter the details of components used in goods such as medical instruments and computers.

PC clients run Windows NT Workstation or Windows 2000 Professional, while the back end requires Windows NT or 2000 Server with a Microsoft SQL Server or an Oracle8i database for data storage. Advantage also accepts data transfers from automated machinery such as robot assemblers and testers and stores work instructions, test and quality records, and usage history.

The Advantage

Advantage is similar to existing MESs, says Kenneth Brant, an analyst at Stamford, Conn.-based Gartner Group Inc. But "their ability to provide a manufacturing genealogy of how products are assembled in combination with Internet-centricity and rapid projection implementation is what makes them an interesting company," he says.

Datasweep says it can auto-

mate an assembly line in three months. "That's a big change from the traditional MES project implementation [of 24 months]," Brant says. The other big difference between Datasweep and its competitors, he says, is its ability to feed near-real-time assembly-line information to a Web site so that customers can track the

status of an item being built.

That capability sold Allen Lee, president of ACMA Computers Inc. in Fremont, Calif., on Advantage. His company assembles between 6,000 and 9,000 CPUs per month, all made to order. Tracking an order was easy until a unit was being built. Then it "kind of went into a black hole," Lee says. Sales representatives who needed to answer a customer's questions on order status ended up talking to the people on the shop floor, interfering with

production and cutting the line's efficiency, he says.

Now, salespeople can find an answer through Datasweep 90% of the time, says Lee. Six months after installing Advantage in March last year, the production average per person rose from 85 to 111 units, he says. But he doesn't credit Datasweep with all of that improvement; the project also included simplifying internal processes and training, he says.

Moreover, the internal quality assurance reject rate has dropped to 1.02% from a high of 19%, he says, due to his staff's new ability to quickly analyze Advantage's databases for production problems.

Lee and Chamberlain have earmarked areas for improvement, such as the user interface and the ability to store more information about the whole product life cycle, from incoming materials inspection to warranty claims.

The Sweet Spot

Datasweep's sweet spot is in assembly lines that use discrete components — things like chips instead of liquids — that are hooked together in a certain sequence. Build-to-order is a key segment, says CEO Vladimir Preysman, because Advantage can provide the benefit of Web-delivered order status. First-quarter sales in this fiscal year are up, reports Datasweep, which declined to provide revenue numbers.

Preysman acknowledges that so far the company's sales have been mostly in "green-field" sites that don't have an existing MES installation and that the most common industry is high-tech equipment. "We replace the paper," he says, referring to a sheet called the "traveler," upon which assembly-line workers write down component numbers and the like.

Datasweep needs to target customers with existing MES setups, Preysman says. That will put it up against competitors such as USData Corp. in Richardson, Texas, says Brant, which are upgrading their products to include features like Web site order-status displays, Datasweep's current competitive advantage. ▀

Johnson is a Computerworld contributor in Seattle.



KEVIN CHAO, Steve Volm, Vladimir Preysman, Don Frede and Matt Holleran (from left) are Datasweep corporate officers

Datasweep Inc.

Location: 55 Almaden Boulevard, Suite 600, San Jose, Calif. 95113

Telephone: (408) 350-7300

Web: www.datasweep.com

Niche: Manufacturing data collection and analysis

Why it's worth watching: Its Web-based portal gives external access to near-real-time order status and tracks custom orders.

Company officers:

- Vladimir Preysman, co-founder, president and CEO
- Kevin Chao, co-founder and vice president of engineering

Milestones:

- 1998: Founded
- Sept. 1999: First product available
- Oct. 1999: second round of venture funding
- Dec. 1999: Version 2.0 released

Employees: 85; 400% annual growth projected

Burn money: \$14 million from Accel Partners and Mohr, Davidow Ventures

Products/pricing:

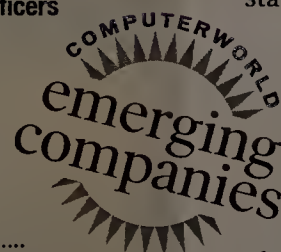
Datasweep Advantage 2.0; installations start at around \$150,000 without services; about \$300,000 with services

Customers: Flextronics International Ltd., Intuitive Surgical Inc., Everdream Corp., KLA-Tencor Corp., Netro Corp., Acma Computers Inc. and Harmonic Inc.

Partners: Agile Software Corp., webPlan Inc., Microsoft Corp., Pitaglio Rabin Todd & McGrath LLC, Strategic Information Group Inc. and Oracle Corp.

Red flags for IT:

- Established players in manufacturing execution systems are also adding Web access.
- Most clients today are in high-tech manufacturing.



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One Step Ahead

Tom Cook, a senior analyst at Boston-based AMR Research Inc., says Datasweep Advantage has a clearly differentiated value proposition, offering fast implementation, a window to the shop floor via the Web, trends analysis using the bundled databases and remote management. Traditional manufacturing execution systems (MES) aren't as well-endowed with features like near-real-time reporting and Web interfaces, he says.

But that's changing: "Everybody else will have Datasweep's functionality in their sights, and they're going to build it up as quickly as possible," Cook says.

That means Datasweep will have to keep a close eye on established competitors.

One quality that will continue to give Datasweep an edge, says Cook, is that the software was written recently, using the latest Internet technologies, and was built from the ground up to be a Web-enabled application. Its competitors, on the other hand, have software that's decades old in some cases, and they're having to tack on new features.

Camstar Systems Inc.

Campbell, Calif.

www.camstar.com

Cook says Camstar has a large set of clients in the electronics manufacturing industry, which overlaps Datasweep's high-tech customer base. Mesa is the company's older MES system, while In-Site is a newer, Windows NT-based, open-architecture application.

USData Corp.

Richardson, Texas

www.usdata.com

Cook says USData's Xfactory takes a tool kit approach that lets users build what's needed for their assembly lines. Its focus on the shop floor has made it light on features such as canned reports, says Cook. The latest release has some capabilities for viewing information over the Web. An add-on called Connector links Xfactory data to a company's back-end business systems.

GenRad Inc.

Westford, Mass.

www.genrad.com

Genrad's Shop Floor Data Manager is often found in PC board assembly shops, says Cook. It integrates with back-end enterprise resource planning systems but hasn't made significant advances with Internet publishing.

—Amy Helen Johnson

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Hiring the Nontechie

Smart employers know they can never find enough skilled IT workers in the job market, so they're creating their own — from nontraditional backgrounds, both inside and outside the company.
By Melanie Menagh

WITH EMPLOYERS still clamoring to find enough workers, smart companies have made great leaps in recruiting information technology staff from nontraditional areas. This can mean bringing a recently graduated music major on board or finding a customer service person in-house who demonstrates IT aptitude.

Some employers have found ways to ferret out potential IT professionals. We asked several IT managers how they find and train the right people and what are the benefits of having nontechnies in the mix.

At UnitedHealth Technologies in Minneapolis, there are several paths in technology that non-IT employees can choose. UnitedHealth offers tuition reimbursement for college classes and degrees, so if someone wants to become a programmer, they can educate themselves to fill that roll. The company also has an in-house "Learning Institute."

"We need people who can do the business-analysis testing and implementing for rapid deployment of IT solutions," says Darcie Corbin, vice president of business systems planning. "For

half their day, they take courses in business analysis and testing and project management."

Many companies do this sort of career transitioning on an informal basis. Greensboro, N.C.-based Guilford Mills Inc., a fabrics manufacturer, had difficulty recruiting employees in rural Cobleskill, N.Y. "We were unable to find qualified IT people," says Bryan Puffer, an information systems technician, "so we looked elsewhere" — within the company.

"Somebody here who enjoyed playing around with his home computer expressed an interest," in technology Puffer says. Puffer and his boss provided much of the basic training and mentoring the employee needed. When more advanced skills were required, his boss provided formal Novell training.

In a tight job market, Rob Figliulo, chairman and CEO of SPR Inc., an IT services company in Oak Brook, Ill., looks among non-computer-science college graduates.

"Give me the right person, and I'll give them skills. We're looking at whether you have the right attitude and disposition for the job rather than what skill set do you have," Figliulo says.

Training Fills Gaps

SPR employs graduates with majors ranging from math to music. Non-IT hires are trained on BroadVision, Java and HTML. "We give them formal training, then we assign them a mentor, put them on project teams with people skilled on those tool sets and they do very well," he says.

Of course, hiring nontechnologists for IT roles requires some give-and-take. "Managers are more flexible with hiring requirements, with the idea of supplementing training," says Linda Fagare, a technical recruiter at The Boeing Co. in the Seattle area.

Boeing has a variety of train-

ing options. "We have a very extensive program of off-hours classes in C++, software and programming. We also have the 'Learning Together' program, where Boeing will pay you to take accredited college or university classes or get another degree," Fagare says.

Specialized skills are particularly important. "We need people with domain knowledge in command/control, intelligence, surveillance, guidance and navigation. We'll get people who don't have IT experience but do [have experience] in these areas, and we will train them on IT," says Fagare. "It's usually much easier to teach the people the technology rather than the domain area of our business."

Managers need to look beyond traditional IT talent. Judith Volente, a consultant to the IT division of CGU Corp., an insurance company in Foxboro, Mass., suggests, "You need someone who has an innate curiosity and flexibility — someone who can handle multiple tasks and look at the

bigger picture. Project management is the most important; conflict management is next."

Non-IT employees with these special qualities can opt for the "Choose IT" training program at Sprint PCS Group in Kansas City, Mo. "You have to go through an application process," says Cleone Davis, vice president of application development and information resource management.

"We determine which specific skill sets we're short on, such as Web development. Then people are interviewed, and we do aptitude testing for that kind of work," says Davis.

Candidates who are selected go through formal training as well as a mentored internship with on-the-job training for six months to a year.

"If you give this person the chance to significantly change their career and earnings potential, that will make them feel good about Sprint and want to stay with Sprint," says Davis. ▀

Menagh is a freelance writer in Maple Corner, Vt.



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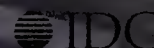
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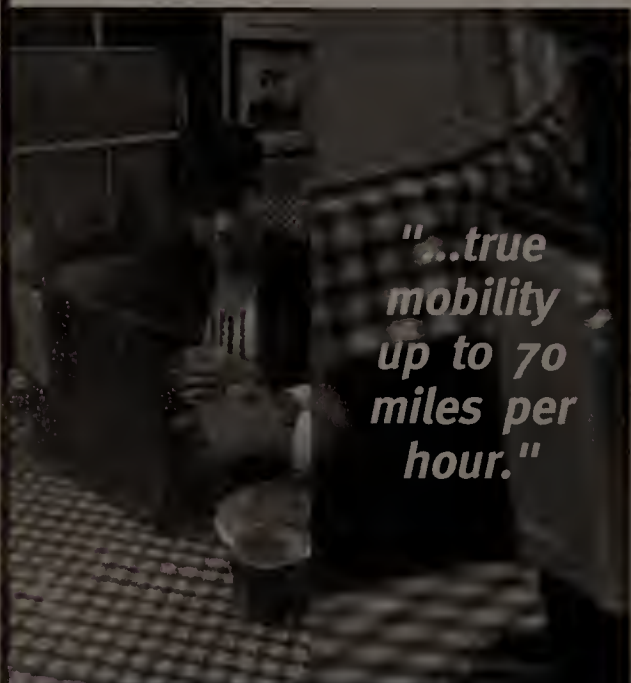
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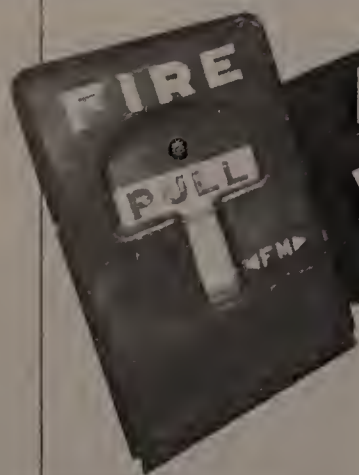
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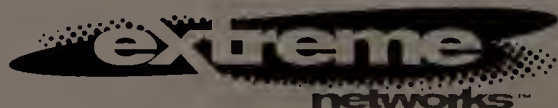
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You will be responsible for planning, designing, and developing hardware, as well as planning schedule design, integration, and test activities. Will develop requirement documents and specifications while establishing parameters for appropriate hardware documentation, instruction manuals, test procedures, and related materials. Will act as a liaison between software and hardware personnel inside and outside the company; manage hardware subcontractors; work with marketing to design and develop hardware for specific customer applications. Will participate in proposal preparation for new or customer-specific products and recommend improvements in new and existing products. Will also be responsible for preparing departmental budgets and manpower requirements. Will act as a consultant to customers regarding technical matters. To qualify, you should have 5 or more years of experience managing 5 or more people in a hardware design and LSI design environment. Experience managing subcontractors as well as telecommuters and remote subcontractors. ISO 9000, P & L and active design & architectural experience. Telecommunications industry experience.

Software Engineering Manager

You will be responsible for planning and managing all software development. Will develop requirement documents and specifications while establishing parameters for appropriate hardware documentation, instruction manuals, test procedures, and related materials. Will act as a liaison between software and hardware personnel inside and outside the company; manage software subcontractors; work with marketing to design and develop software for specific customer applications. Will participate in proposal preparation for new or customer-specific products and recommend improvements in new and existing products. Will also be responsible for preparing departmental budgets and manpower requirements. Will act as a consultant to customers regarding technical matters. To qualify, you should have 5 or more years of experience managing 5 or more people in a hardware design and LSI design environment. Experience managing subcontractors as well as telecommuters and remote subcontractors. ISO 9000, P & L and active design & architectural experience. Telecommunications industry experience.

Networking Software Engineers

You will design and develop software for telecommunications and networking products. This includes networking protocols layered on a real time system with many asynchronous tasks communicating by message queues or semaphores. To qualify, you must be capable of programming in C and C++ and of understanding object-oriented programming. Experience with SNMP and management functions including alarms and provisioning is also desirable. Familiarity with standards, including ITU-T, ATM Forum, and Frame Relay Forum is highly desirable.

LSI Design Engineer

You will be responsible for performing and coordinating all activities required to complete ASIC designs and implementation. Performs engineering, development, and design activities. Work includes complex design, modification, simulation, and debugging of chips, boards and systems. It also involves evaluation, configuration and operation of LSI development tools. To qualify, you should have a BSEE or equivalent with at least 3 years experience in LSI and FPGA design using VHDL or Verilog.

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You will be responsible for identifying, recruiting, and managing relationships with other companies to meet Mariner Networks' business goals. To qualify, you should have technical marketing or sales experience in networking or telecommunications. Your experience should include developing relationships in at least one of the following areas: interoperability partnerships, joint development agreements, standard setting agreements, joint marketing, private labeling, co-selling agreements and M&A.

Send Resumes To:

Rachelle Munson
Mariner Networks
1515 South Manchester
Anaheim, CA 92802
Fax: 714-780-7999
E-mail: rlm3@marinernetworks.com
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Full time Business Consultant to work as a member of a small specialized team focused on implementation of relational databases and applications support. Will analyze business requirements of client and make recommendations to client and team members regarding software implementation. Must have a Bachelor's degree in Business Administration. Must have 2 years of experience in the job offered or two years of experience in a position with same duties. Salary: \$60,000.00. Send resumes to: Lisa Till at Application Partners, 180 Interstate North, Suite 260, Atlanta, GA 30342.

SR. SOFTWARE ENGINEER

Segue Software, leader in e-business reliability solutions, seeks SW Engineer at Lexington to design/develop/test GUI and software functional testing products. Forward resumes to segue@rpc.webhire.com or Segue Software/RPC, P.O. Box 1040, Burlington, MA 01803, or fax: 800-892-3609 and code IW500.



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Fulltime Application Specified Integrated Circuit (ASIC) Design Engineer responsible for designing low power high speed CMOS ASIC communication devices in the area of Modems and Audio/Video applications using Digital Communication products, Digital Signal Processing techniques, Computer Architecture, custom circuit design techniques, Verilog/VHDL, Synopsys synthesis tools and Avantil placing/routing tools, Verilog XL and QuickHDL, embedded processor applications and peripherals, assembly, C and PLI programming languages, DFT design tools for SCAN, and BIST insertion, and test vector and ATPG test pattern generation. Responsible for system level integration, chip-level integration of mixed signals IC's, system simulation modeling test bench design, and to end system simulation and chip-level validation of modern. Must have a Master's degree in Electrical Engineering. Must have 3 yrs. exp. in the job offered or position with same duties. Salary: \$65,000. Send resume to: Gwinnett Job Order #6734024, 1535 Atkinson Rd., Lawrenceville, GA 30043-5601 or nearest Dept. of Labor Field Service Office.

Analyst Programmer Lead. Job location: Atlanta, GA. Duties: Supervise & administer environmental laboratory, dept. network & dept. website. Design & develop economical experiment soft. (Object Oriented & Client Server architecture application) by utilizing Rational Rose Solution & Visual Basic programming. Implement department's on-line course project by utilizing ASP and JAVA. Install, configure, administer & support Microsoft Windows 95, 98, NT Workstation & Server. Involved in application design & development utilizing Windows environment & Visual Basic, VBA (Visual Basic for Application), Microsoft Office with Macro development. Involved in Web page design & development using Visual Basic, Java Script, ASP & HTML. Involved in system design & development utilizing Rational Rose & Microsoft Visual modeling. Requires: B.B.A. or foreign equiv. in Comp./Info. System, Marketing, Finance or a related field plus 1 yr. exp. in the job offered or 1 yr. exp. as an Analyst. Exp. which may have been obtained concurrently, must include: 1 yr. exp. using Object Oriented & Client Server architecture application & 1 yr. exp. in web page design & development using Visual Basic, JavaScript, ASP & HTML. Send resume to Ronald G. Cummings, Georgia State University, University Plaza, Atlanta, Georgia 30338.

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Is an information management & technology consultancy co. with offices throughout the U.S. We work with many organizations to develop integrated solutions that transform their enterprises. By understanding the key components that drive an organization, we are providing tangible results & a competitive advantage to our clients.

SVI America Corp. presently requires Programmer Analysts with the following qualifications: A Bachelor's degree in Comp Sci, Math., Eng'g, Business Admin. or a related discipline, 1 yr exp in job offered, and working knowledge of COBOL and RDBMS. Must be willing to temporarily relocate to client sites throughout the U.S.

To apply, please contact: HR Dept., SVI America Corp., 15800 John J. Delaney Drive, Suite 250, Charlotte, NC 28277 or E-mail: jobs@svi-america.com

PROGRAMMER/ANALYST
Jacksonville, FL

Design/dev't of ActiveX controls for corp. intranet components for fund assessment MIS data on DB2; develop MTS middleware utility to facilitate cross server MTS packages & active template library components; manage, coordinate automated distributions for supporting files for deployment apps utilizing: MS Office Transaction Server, MS queue, MS VB, C++, Active Server pages, Visual Interdev, MS Office Development OLEDB, Active Data Objects, Active Template Library, MS Cobol & DCOM. 2 yrs. exp. in offered job or programmer developer. M-F, 9-5. \$60K/yr. Send resume to: Dept. of Labor, Bureau of Workforce Program Support, P.O. Box 10869, Tallahassee, FL 32302, Re: JOFL - #2115000.

Software Engineer

LiveVault Corporation is looking for a highly motivated Software Engineer to join the team designing and implementing the communication and security components of our latest real-time backup product. Candidates should have experience in object-oriented development using C/C++, TCP/IP protocols, and TCP/UDP sockets on Windows NT and UNIX. Also required is a solid understanding of Windows NT internals and Windows APIs. Prior experience developing Virtual Private Networks (VPN), Public Key Certificates, or firewalls is highly desired. An advanced degree in Computer Science or Engineering is preferred. Additional experience or training in the areas of computer networks and network security is a significant plus. LiveVault provides an attractive salary and benefits package including stock options. LiveVault is an Equal Opportunity Employer. Please email resumes to piccolo@livevault.com or fax to (508) 460-6771 attn: Rich Piccolo.

Systems Analysts, North Bethesda, MD. Develop CGI, client/server software for biomedical applications, including sequence comparison, sequence alignment algorithms, biological database development, contig assembly algorithms, protein & DNA/RNA sequence analysis methods & algorithms using C/C++, Perl, SQL, CGI, HTML & Oracle or Sybase databases, relational databases, Shell Script languages for OS Windows NT & Unix. Req'd. B.S.C.S. or related field & 2 yrs relevant exp. M-F, 40hrs/wk. Send Resume to K. Durazo, HR, Ref. # 301, InforMax, Inc., 6010 Executive Blvd., 10th Fl., N. Bethesda, MD 20852.

PROGRAMMER ANALYST. for Lansdale, PA computer consulting firm. responsibilities incl: System Analysis, design development, implementation client interface & documentation of various business applications, writing & modifying programs, create/interface w/ databases, testing systems for final production implementation using Unisys A series/Clearpath mainframes using LINC, Cobol, SMSII, WFL and System Utilities. Investigation & resolving problems arising in day to day working of insurance applications, writing data extraction rep for conversion, developing New Reports for Management Information. Req. MS in engineering and 2 yrs exp. in the job offered, or as software engineer. 40 hrs per wk, mon. thru fri., 9am to 5pm. salary \$65,000/yr. Must have proof of legal authority to work in the U.S. report/submit resume or cv to: job order # 7064388, the phil. job bank, 444N. 3RD ST.-3RD FL. Phila., PA 19

Manager e-Business Intelligence/ my SAP.com Solutions: Direct, coordinate, and exercise functional authority for planning, organization, control, integration, and completion of the implementation of manufacturing/business applications. Plan and formulate business intelligence program and organize project staff according to project requirements. Assign project personnel to specific phases or aspects of the project. Requirements include a Bachelor's degree or equivalent combination of education and work experience in Engineering or related field and two years of pre-or post-degree experience in the implementation of manufacturing or business applications. Applicants must have unrestricted authorization to work in the United States. Salary \$80,000/year. 40 hours/wk. Respond with two copies of resume to Case #20003006, Labor Exchange Office, 19 Stanford St., 1st Fl., Boston, MA 02114.

I.T. Sales/Marketing Manager. Fast growing I.T. company seeks Manager of Sales/Marketing for its PA office to manage information technology services & project procurement sales/marketing activities. Will be responsible for directing staff training & performance evaluation to develop & control sales program, establish national & international sales territories, establish business partner relationship, market technical resources & software projects, recommend/approve budget expenditure for research & development work, ensure timely project execution, oversee customer satisfaction & technical/software support, set up control & reporting system. Req. Bachelor's/Equivalent Degree in Computer Science/electronics/communications/related field & 6+ yrs. of exp. in sales/marketing in the field of I.T. Sal. \$67,000 p/a. Resume to Compudyne Winfosystems Ltd., 1822 Spring Garden St., Ste. 226, Philadelphia, PA 19130-3917.

SOFTWARE ENGINEER for Lansdale, PA computer consulting firm. Responsibilities incl: Design, development & implementation of comp. software. Develop GUI-based applications, systems software & embedded software. Analyze business engineering & scientific problems; develop well-defined procedures and programs in the delivery of practical systems solutions using Unisys A series/Clearpath, mainframes using Cobol, DMS-II, WFL, COMS, CANDE and system utilities. Req. Masters Degree or a Bachelor of Science Degree in Computer Science with five years progressive experience in the job offered, or as a systems analyst. 40 hrs per wk, mon. thru fri., 9am to 5pm. salary \$67,000/yr. Must have proof of legal authority to work in the U.S. submit resume or CV to: job order # 7064390, the phil. job bank, 444N. 3RD ST.-3RD FL. Phila., PA 19123

Senior Lotus Notes Developer-Design, code, test, and implement the company's e-business solutions. Work with teams to perform development of workflow products for Human Resource, Finance, Materials Management and Process Control applications using Lotus Notes/Domino. Participate in product design meetings with team members, interact with clients to gather requirements, and perform product review sessions. Perform design, implementation and maintenance of product modules and conduct the unit testing and integration testing for functionality and limits, as well as research problems discovered by Quality Assurance. Requirements include a Bachelor's Degree or equivalent in Computer Science, Engineering Discipline or related field with at least five years of progressively responsible experience in job offered or related field of developing applications using Lotus Notes. Applicants must have unrestricted authorization to work in the United States. Salary \$75,000/year. 40 hours/wk. Respond with two copies of resume to Case #20002963, Labor Exchange Office, 19 Stanford St., 1st Fl., Boston, MA 02114.

Senior Database Administrator, to design, develop, and maintain databases working with application developers and project teams. Will assure data integrity, processing efficiencies, database performance and integration of changes. Will develop and implement CA-IDMS and Oracle databases to meet corporate information management objectives. Requires Bachelor's Degree or equivalent in Computer Science, Engineering, or Information Technology, and three (3) years experience in job offered or three (3) years experience in database administration. Candidate must also possess demonstrated expertise using ORACLE and/or SQL-Server, demonstrated expertise developing and implementing CA-IDMS or managing large databases, and demonstrated expertise using Windows 95/NT. Salary: \$79,560/yr; Mon-Fri, 9:00AM-5:00PM. Submit two (2) copies of resume to: Case Number 20003036, Labor Exchange Office, 19 Stanford St., 1st Fl., Boston, MA 02114. EOE. Applicants must be U.S. workers eligible to accept employment in the United States on a full-time basis.

Programmer/Analyst wanted by Computer Services Firm to plan, develop, test & document comp s/ware appl systems using Visual Basic, Sybase, & MS SQL Server in Windows & UNIX envrmt. Bach in Comp Sci, Comp Eng, or Comp Info Systems & 1 yr exp.

Respond to: HR Dept, Rayex, Inc., 102 Tamarack Cir., Skillman, NJ 08558.

Programmer Analyst. 8a-5p; 40 hrs/wk. Dsgn, prgm & implmt s/ware appls using OO technologies, PowerBuilder, Power J, Sybase, SQL Anywhere, CASE Tools, ODBC, Dataflex, TUXEDO & Win NT. Masters or equiv w/major in Comp Sci or Engg; Electronic or civil or related branch of Engg. In lieu of Masters candidate can have Bach in specified major & 5 yrs progressive exp in s/ware applic dvlpmnt. Job loc: Charlotte, NC.

Mail resume w/r#004 to: HR, Youcentric, Inc., 6000 Fairview Rd, Ste 405, Charlotte, NC 28210 or email: resumes@youcentric.com

Software Engineer. Multiple positions Responsible for the architecture, integration, & design of systems for broad business areas such as warehousing, transportation, accounting, or a specific technology such as EDI or RF/Bar coding. Position uses software tools including Synon Obsydan, Synon 2/E, RPG III/IV, AS/400 CL, data modeling, & Computer Aided System Engineering. Specific duties include: Work closely with a project team to understand bus. req. prepare system gap analysis & recommend system solution; define system reqs & design specs; define system flows, integration points, & data elements. All phases of software development (e.g., programming & analysis). Conduct continuing review of business & computer technological developments & advise management regarding schedule, operational, economic & technical merits, or project for future planning & budgeting. Conduct technical walk-through to provide feedback to the developer & ensure software quality & compliance with QA standards. Provide training & guidance to more junior team members for technical problems & design issues. Experience/ Education: Bachelor's degree in computer science or related field, or equiv., plus at least 5 yrs of exp. as software engineer (or related experience) including two years of development project management on IS projects. Job Location: Jacksonville, FL. Work Schedule: 40 hrs per wk/8:30 a.m. to 5:00 p.m./M-F. Respond to: Sr. Employment Manager; DOL-JV-1;GATX Logistics Inc.; 1301 Riverplace Boulevard, Suite 1200; Jacksonville, FL 32207

Full-time Systems Analyst, Client/Server Development. Responsibilities include: design, develop and implement multi-tiered client/server, Internet/Intranet based, object-oriented applications using Visual Basic, C, C++, Java, Java Servlets, EJB, JSP, ASP, XML, WML, VB Script, Java Script, Microsoft Transaction Server and COM/DCOM, Internet Information Server and Visual InterDev, OLAP, Powerbuilder foundation classes and UNIX; perform installation and tuning of Oracle and MS-SQL Servers; develop GUI applications using Powerbuilder 6.5; perform application and database tuning; perform backup and recovery of database, perform user acceptance tests and user training; perform trouble shooting for applications and serve as liaison between client and Director of Software Solutions. Must have an Associate of Science degree or foreign equivalent in Computer Science or Computer Engineering and at least 2 years of experience as a systems analyst, programmer analyst or software engineer, or a Bachelor of Science degree or foreign equivalent as described. Must be proficient in Visual Basic, C, C++, Java, Java Servlets, EJB, JSP, ASP, WML, XML, VB Script, Java Script, MTS, IIS, object-oriented applications, GUI tools, case tools, Oracle Server 7.3 or higher, MS-SQL Server 7.0 and UNIX. Must be willing to travel to client sites Monday-Friday. Salary Range: \$63,000 - \$70,000 per year. Must have proof of legal authority to work in the United States. If interested, submit resume to: Mr. Thomas Koshy, NIIT (USA), Inc., 1050 Crown Pointe Parkway, Suite 900, Atlanta, Georgia 30338.

International Vice President of Information Systems. Oversee project to integrate the management information systems (MIS) & information technology systems (IT) for the corp. group of glass fiber mfr on a global basis. Plan internat'l project strategy & coord. implementation of same. Analyze & evaluate global MIS & IT systems in place company-wide & the changes that need to be implemented to achieve worldwide integration & compatibility. Dev. training programs for U.S., Eur., & Asia personnel regarding the tech., operation & maintenance of integrated MIS & IT systems. Provide troubleshooting advice re tech. issues related to MIS & IT systems. Provide leadership for integration & implementation of global innovative & cost effective IT/MIS solutions & global networking solutions (intranet, Internet, etc.) for multiple locations of comp. w/ glass fiber mfg industry. Coach & manage diverse, internat'l Bd of Directors to reach consensus on innovative IT/MIS integration issues. Oversee all MIS/IT personnel & business systems at all AGY locations globally. AGY operates Sun, HP, & Compaq hardware utilizing Unix & NT operating systems plus its own WAN & LANs. Applications include MS Desktop, Oracle Financials, Oracle Process Manufacturing, Ceridian HRIS, & Medgate and others. Prereqs: Bach. degree (or equiv.) in comp. sci., MIS, or related field, plus at least 6 yrs of relevant exp. in implementation of business-related information systems, integration of IT solutions, & /or networking (intranet, Internet, etc.). 40+ hrs per wk/8:30 a.m. to 5:00 p.m./M-F. Job Location: Aiken, SC. Respond to: Advanced Glassfiber Yarns LLC; World HQ; PR/DD/AW; 2558 Wagener Rd; Aiken, SC 29801.

Full-time Project Manager, Client/Server Development. Responsibilities include: manage multi-tiered client/server, Internet/Intranet based, multi-user, re-engineering applications projects throughout the United States; manage systems analysts, business analysts and support staff; plan, monitor and prepare status reports; audit applications quality to ensure adherence to Quality Management Systems; manage implementation of applications; manage user acceptance tests and user training; perform Capacity Planning for applications; and serve as chief liaison between client and Director of Software Solutions Division. Must have a Master of Science degree or foreign equivalent in Computer Science or Computer Engineering and at least 3 years of experience as a systems analyst, programmer analyst or software engineer, or a Bachelor of Science degree or foreign equivalent and at least 5 years of progressive experience as described. Must be fluent in the design, development, implementation and optimization of Internet-based applications and databases using Visual Basic, C++, ASP, XML, VB Script, Java Script, MTS, IIS, object-oriented applications, GUI tools, case tools, Oracle Server 7.3 or higher or MS-SQL Server 7.0 and UNIX; must be proficient in Internet Bill Presentation and Payment applications. Must be willing to travel to client sites Monday-Friday. Salary Range: \$68,500 and up, commensurate with experience. Must have proof of legal authority to work in the United States. If interested, submit resume to:

Mr. Thomas Koshy
NIIT (USA), Inc.
1050 Crown Pointe Parkway Suite 900
Atlanta, Georgia 30338

Systems Analyst; Jackson, MS: Provide data processing solutions to bus. opportunities in mission critical systems. Provide tech. expertise, assistance in coding & informal leadership in sys. development, maintenance & production processes. Recommended improvement to bus. processes, procedures & methodologies. Provide project leadership. Provide guidance in bus. analysis, tech. design, coding & testing to develop software eng. solutions to bus. problems. Assist w/ software design reviews for major project areas. Coordinate & facilitate meetings w/ users to validate requirements, designs, prototypes & test results. Code, test/implement solutions. Identify/recommend sys. enhancements & performance improvements. Assure compliance w/ development standards. Recommend solutions to users & staff on technical issues related to database design, software coding techniques & development of life cycles methodologies to meet bus. objectives. Conduct & participate in review, evaluation & recommendation of software products, productivity tools & external svcs. Apply knowledge of RPG, RPGLE/CLP on AS/400 platform. Bachelor's in Computer Science or Mechanical Eng. & 2 yrs exp. in the job offered or in a programming, systems analysis or software eng position. 40 hrs per wk \$55K per yr. Resume to M. Cravey, Sky Tel, 200 S. Lamar St. Jackson, MS 39201

Hardware/Firmware Engineers: Conduct research and development of new technologies for computer and communications systems. Exp and/or background in the following areas (not all req): servo control theory and algorithm design, analog/digital circuit design and simulation, logic design and using ALTERA programmable devices, Hard Synthesis, magnetic recording head processing, electroplating, etching, photolithography, vacuum deposition, and magnetic material characterization FPGA/ASIC/Custom design an timing analysis, microprocessor based systems hardware and firmware design, MPEG-2 transport systems, digital signal processing, PC bus interface, board layout, instrumentation and C/C++ programming. Req: MS in EE/Comp Eng + 1,2 or 3 yrs exp (or equivalent) depend on position or B.S. + 3-8 yrs exp depend on position in Austin, TX, San Jose, CA, Hawthorne or Yorktown Heights, NY, Endicott, NY. Competitive salary. Please send resume w/clipping of ad: IBM Corporation, Technical Recruiting, Job Code CW09B00, P.O. Box 218, Yorktown Heights, NY 10598. An equal opportunity employer.

Senior Software Engineers eCash Technologies, the leading developer of electronic payment software, is seeking senior software engineers to design, develop and implement Web-based on-line payment systems. Requirements: master's in engineering, computer science, physics, or math, and experience in developing on-line transaction processing systems using C and C++ to run on Windows and Unix operating systems, and experience with at least two of the following (separately or concurrently): Secure Socket Layer, Digital Certificates, Rivest Shamir Adleman, and Blind Signature. Premium salary. Excellent benefits. Location: Bothell, Washington. E-mail your resume in text format to resumes@ecash.net (indicate job code (ENG-048) in the subject header), or mail your resume to Recruiting, Attn: Job Code ENG-048, eCash Technologies, 19015 eCash Technologies, Inc., Ste. 105, Bothell, WA 98011.

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- C/C++, Perl, RDBMS, SQL
- Optics/Sonet, Switching
- LAN/WAN, TMN, CMIP/CMISE
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All positions require strong communication and interpersonal skills. We offer competitive salaries & a full benefits package to all employees. Please forward your resume to our recruiting department: mbarbera@softwareconfiguration.com or fax to: (732) 450-0715 attn: M. Barbera.

Infinite Computing Systems, a Cedar Rapids, Iowa Information Technology and Consulting Firm is looking for highly motivated Systems Analysts, Programmer/Analyst, Software Engineers and Project Managers. Some Senior Level positions are also available. We are recruiting IT professionals with experience in the following areas:

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- Oracle, Visual Basic, JCL, CICS
- MAPICS, RPG400, CL400, SOL400, QUERY400, SYN-ON, ASSET

Candidates must be willing to relocate. Infinite offers competitive salaries. Please send resume to Career Opportunities, Infinite Computing Systems, 230 Second Street SE, Suite 214, Cedar Rapids, Iowa 52401

Systems Development and Operations Support - Must have 1 1/2 years experience in job offered or 1 1/2 years experience in job related as Software Engineer. Design and develop complex data processing systems and applications. Develop new computer algorithms and specific functional classes. Develop logical and physical database design and implement effective debugging techniques for systems. Work with technical writers to prepare user documentation. Prepare time and cost estimates for systems development work. Provide technical coaching and training sessions for other staff members and associates. 40 hours per week, 8:00 am to 5:00 pm. Salary: \$60,000 per year. Qualified applicants please send resumes to Lynn McCommond, Human Resource at ComCoTec, 2505 S. Finley Road, Suite 110, Lombard, Illinois, 60148.

Business Systems Analyst needed for software development and consulting firm in Duluth, GA. Job duties include analyze, design and develop computer software business applications. Prepare financial and business related analysis and research in financial and expense performance, rate of return, depreciation of working capital and investment. Prepare forecasts and analyze trends in manufacturing, sales, finance, general business conditions and other related areas. Use Windows NT, C++, SOL, Visual Basic, MS Access and RDBMS. Applicant must have M.B.A. in Business or MIS related area. Must have either coursework or exp. in the areas of development of business applications and use of Visual Basic, SOL and Access. 40 hrs/wk, 8:00 am-5:00 pm Mon-Fri; \$62,920 per yr. Apply in person or send 2 resumes & cover letters (no calls) to Gwinnett, Job Order# GA 6739477, 1535 Atkinson Rd., Lawrenceville, GA 30043-5601 or the nearest Department of Labor Field Service Office.

SOFTWARE ENGINEER to design, develop, implement, test, and support software for complex distributed knowledge based platforms using C, C++, Visual Basic, VB Script, COM, DCOM, DHTML, Java, Java Applets, Java Beans, Java Script, TCP/IP, Visual InterDev, Orbix, CORBA, Oracle, and Perl under Windows and UNIX operating systems; Use object oriented GUI based tools in a client/server environment. Require: M.S. degree in Computer Science, an Engineering discipline, or a closely related field, with two years of experience in the job offered or as a Systems Engineer. Salary: \$75,000 per year, 8 am to 5 pm, M-F. Send resume to: Gaylene Bickham, Recruiting Projects Specialist, IDAPTA, Inc., 817 West Peachtree St., Suite 750, Atlanta, GA 30308; Attn: Job MR.

SOFTWARE ENGINEER to design, develop, test and implement web-based application software using Java, Weblogic, Java Server Pages (JSP), Java Beans, Java Servlets, Extensible Markup Language (XML), C++, Graphical User Interfaces and object-oriented methodologies on Windows and Unix platforms. Require: M.S. degree in Computer Science, and Engineering discipline, or a closely related field, with two years of experience in the job offered. Salary: \$70,000 per year, 8:00 am to 5:00 pm, M-F. Apply by resume to Dayaker Mallipedi, President, MillenniumSoft, Inc., 8301 Arlington Blvd., Suite 504, Fairfax, VA 22031; Attn: Job RT.

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Fax: 415-541-0224, EOE
E-mail: Jos_Barnett@splwg.com
www.splwg.com

SENIOR SOFTWARE ENGINEER to design, develop, implement, test, maintain and support application software in a client/server environment using C, C++, Perl, CORBA, RDBMS, X-Windows, Informix, Oracle on HP-UNIX and SUN Solaris platforms. Require: M.S. degree (or equivalent) in Computer Science, and Engineering discipline, or a closely related field, with three years of experience in the job offered or as Software Engineer. A.B.S. degree with five years of progressively responsible experience will be accepted in lieu of the M.S. degree and three years of experience. Salary: \$75,000 per year, 8:00 am to 5:00 pm, M-F. Apply by resume to: Roz L. Alford, Principal, ASAP Staffing LLC, 3885 Holcomb Bridge Rd., Norcross, GA 30092; Attn: Job SC.

SOFTWARE ENGINEER to design, develop, test, implement, maintain and support application software in a Windows NT/95/98 environment using C++, Visual Basic, Java, VBScript, JavaScript, HTML, DHTML, XML and SOL while adhering to the software development standards and specifications of COM, CORBA and UML. Require: M.S. degree in Computer Science, or a closely related field, with 2 years of experience in the job offered or as a Programmer/Analyst. Salary: \$60,000 per year, 8:00 am to 5:00 pm, M-F. Apply by resume to: Andrew Burhans, Software Engineering Manager, Republic Mortgage Insurance, 190 Oak Plaza Blvd., Winston-Salem, NC 27015; Attn: Job RT.

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Design and develop software systems & programs. Analyze, design, formulate, implement, test and maintain software using Oracle development tools. Reqs: MS Computer Science, Engineering, related discipline or equivalent, or BS Computer Science, Engineering, related discipline or equivalent and 5 years' experience in job offered, PA or combination.
Competitive salaries. Position based in Ft. Lauderdale, FL. Send resume to A.J. Solutions, Inc., 3201 W. Commercial Blvd., Ste 225, Ft. Lauderdale, FL 33309 or ajoshi@gate.net

Software Engineer. Design, develop and maintain business applications including designing of databases and front-end applications. Demonstrated ability designing and developing business applications using IMS and PL/1 in MVS environment. Demonstrated ability providing application support and maintenance. \$76,252/yr. 40 hr/wk. 9 a.m. - 5 p.m. Must have 1 yr. exp. (or 1 yr. exp. in related occupation of Programmer/Consultant) and M.S. in Comp. Sci., Eng., rel. field/equiv. Send 2 resumes: Case #20002841, Labor Exchange Office, 19 Staniford Street, 1st fl., Boston, MA 02114.

Manager-Web Development- ABC-Naco, Inc., Downers Grove, IL - Direct implementation of enterprise resource planning software; develop, implement and support new Information Technology solutions; assist in migrating existing software and hardware systems; and implement and maintain E-R-P software package. Administration of Microsoft NT4, 11S4, SOL 7 and Backup tools. Apply marketing concepts and strategies to web-based communications tools. Requires a B.S. in Business Administration/Computer Science/Information Technology or equivalent required. Fax resume to Jon Viganò at 630-737-0167. No calls please.

ITT Cannon, an electro-mechanical components manufacturer, has immediate openings in Santa Ana, CA location for:

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- Program Manager
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Positions require Bachelor's or Master's (degree and experience requirements vary with position and level). We offer competitive salary and benefit package, commensurate with position level and qualifications. Mail or fax your resume/letter of qualifications to ITT Cannon, ATTN: Human Resources, P.O. Box 929, Santa Ana, CA 92705. Fax: 714/628-2050. Please reference Ad# 4250. EOE.

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Linear Software Solutions, inc. urgently needs IT Professionals with a min. 2 yrs. industry experience in MS-C, C++, PL/M, FBA Navigator, Paradox, WinNT Internals, Image Server, ATL-COM, ISAM, CTOS-Open, Unisys Micros system, COM, Discoverer 2000, SOL Server. Travel reqd. Will work at unanticipated locations in the US. Send resume & salary reqmnts. to 41 Vreeland Avenue, Ste. 23, Totowa, NJ 07512.

IT Client Service Business Analyst

This position provides business analysis and support in the development and maintenance of IT Projects in an SAP and Clarify EMS environment. Applicant must have a minimum of 3 years of relevant IT work experience and a BS degree in IT or related field. Interested candidates must email resume to Bob Shell (bob.shell@gecds.ge.com)

GE Capital IT Solutions

SOFTWARE ENGINEER to design, develop, implement, test, maintain and support application software using Rational Rose, Java, Java Servlets, JavaScript, Java Swing, C++, Oracle and Pro*C/C++ on UNIX and Windows NT platforms. Require: M.S. degree in Computer/Systems Science, an Engineering discipline, or a closely related field, with two years of experience in the job offered or as a Programmer/Analyst. Salary: \$68,000 per year, 8:00 am to 5:00 pm, M-F. Apply by resume to: Roz L. Alford, Principal, ASAP Staffing LLC, 3885 Holcomb Bridge Rd., Norcross, GA 30092; Attn: Job VT.

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Business Analyst to conduct analysis and determine client software, technical and application service provider (ASP) requirements. Duties performed will include technical skills in areas such as SOL Server, Visual Basic (VB), Access, ASP. Interface with Internet programmers to ensure they fully understand the technical requirements of the each client and product requirements. Beneficiary will do testing of software. Bach. degree in Computer Science and one year experience. Send Resume to IS-arla Inc, 699 Fall River Ave., 1st Floor, Seekonk, MA 02771.

Internet Programmer - Forsythe Technology, Inc., Skokie, IL - Maintain and enhance internal intranet order management system. Design and code enhancements for the system, as well as interface processes between OrderPro and Lawson/AMS. Read, analyze, and interpret technical documentation and professional journals. Utilize expertise to effectively handle internal computer issues. M.S. in Computer Science or equivalent and 1 year experience as a Software Programmer required. Fax resume to Travis Huggins at 847-675-8017. No calls please.

Software Developer, multiple positions - For Internet Co., resp. for developing state of the art on-line financial systems over Internet & commercial on-line systems for Co's customers; programming, testing & rollout of Web-based transactional systems; programming & prototyping in web languages including Java, C/C++. Reqs: M.S. or equiv. in Comp. Sci. or related field. In lieu of M.S., a B.S. or equiv. in Comp. Sci. or related field, & 5 yrs. exp. as Software Developer; Proficient in Obj. Orient. concepts, Unix, Java, C/C++ & Perl. Travel required. 40 hrs/wk. Resumes to: Melissa Ryan: resumes@destiny.com.

SR. ORACLE PROGRAMMER to plan, schedule, and direct preparation of programs to process inventory, engineering, accounting, & operations matters applying PL/SOL and other ORACLE tools to create Oracle forms and reports in a UNIX environment. Consult with managerial and systems analysis personnel. Develop applications from workflow charts and plan full range of programming actions. BS in Electronics Engineering, Computer Science or related field, and 6 years experience. Position is based in Miami, FL. Send resume to BFGoodrich Aerospace c/o B. Gomez, 3201 NW 167 St., Opa Locka, FL 33056.

Unix Network Administrator- HCIASachs, Evanston, IL - Upgrade, configure and set up Sun 6500. Assist with relocation of entire data warehouse. Administer multiple UNIX environments. Set up security, file systems, hardware and software configuration. Perform system upgrades to multiple UNIX platforms. Serve as UNIX point person for information systems team. Utilize UNIX and Windows NT for user accounts and troubleshooting. Requires a B.S. in Computer Science. Fax resume to K. Kelly at 847-475-0211. No calls please.

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Senior Software Engineer (multiple openings): Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation. Work involves extensive travel and frequent relocation. Must have one year of experience using: 1 of Group A and 1 of Group B and 1 of Group C; OR 1 of A and 2 of B; OR 1 of A and 2 of C as follows: Group A - Windows 3.1, Windows NT, Windows 95, Windows 98, Unix, HP-UX, IRIX, Sun OS; Group B - Visual C++, Visual C, C++, Visual Basic, PowerBuilder; Group C - JAVA, TCP/IP, HTML, MFC, CGI, PERL, ASP, CQM/DCQM, Active X, MTS. Master's degree in one of several limited fields: Computer Sci/Apps, Eng., Chem., Math or Physics. Will accept Bachelors degree with five years of progressive experience as computer professional. Salary is \$75,000 per/yr, 40 hrs/wk., 9:00-5:00 p.m. Please submit resumes to: Mr. Anthony Gebicki, Manager, Westmoreland County CareerLink, 300 East Hillis Street, Youngwood, PA 15697-1808; Job Order No.: WEB 122747.

Software Engineer: Location of Job: Syracuse, NY. Duties: Gather user requirements. Design, develop and implement software application using PowerBuilder 7.0, Oracle 8.0, Jaguar 3.x, Python, Linux and Windows NT. Analyze user requirements and determine and calculate program specifications. Generate reports using PowerBuilder 7.0. Perform software testing and evaluation. Requires: M.S. in Comp. Or Info. Sci. Eng. or related field and 3 yrs. exp. in job offered or 3 yrs. exp. as Consultant, Analyst/Pro. or Programmer. In Lieu of M.S. & 3 yrs. exp., will accept B.S. (or foreign equiv.) and 5 yrs. of prog. exp. in the computer ind. Exp., which may have been obtained concurrently must include 3 yrs. exp. designing, developing and implementing software applications, or 3 yrs. exp. using PowerBuilder. EQE. 40-Hr/Wk., 8:00 a.m. to 5:00 p.m. Salary \$65,000/yr. Send resume (no calls) to Buzz Buhl, CTG, Inc. 6700 Old Collamer Rd., East Syracuse, NY 13057-1134

Programmer Analyst: Perform system analysis, design, development, support, testing and implementation of business and commercial application software using Oracle 7.x, Developer 2000, Forms 4.5, Reports 2.5, Pro*C under UNIX, Novell Network environments. Also perform Oracle Database Administration for Oracle 7.x. Perform fine tuning of network database applications to decrease response time and minimize memory usage by code optimization and efficient algorithms. Prepare technical documentation, user manuals and instructional manuals as required by end-user. Provide on-site maintenance support to customer on various custom software packages including debugging, modifications, fine tuning, and code optimization. Multiple openings. 40 hrs/wk., 9:00 a.m.-5:00 p.m. \$75,000/yr. B.Sc. in comp. science or engin. or equiv. + 2 yrs. exp. in job offered or as systems analyst or software engineer. M.S. + 1 yr. exp. accepted in lieu of B.Sc. + 2 yrs. exp. Apply to: Sharper Logistics, Inc., Ref. NWA11, 615 Beaver Run Rd., Ste. A, Lilburn, GA 30047.

SENIOR DATABASE ANALYST (Philadelphia, PA) to administer Oracle server and database in Windows NT; Design and conduct database tuning, backup and recovery, disaster recovery, and coding using PL/SQL, DCL, DDL, Veritas Backup Exec and Q Diagnostics; Develop stored procedures and packages to build the stage data warehouse for web reporting; Plan, design and develop MS SQL Server data modeling using PowerDesigner; Analyze software requirements to determine feasibility of design; Build and configure SQL Server databases and design business roles to migrate Oracle database to SQL Server environment; Oversee and troubleshoot Oracle, SQL and Web servers, Appeal Processor, Step2 and MS Access applications. Require: M.S. degree in Computer Science, an Engineering discipline, or a closely related field with two years of experience in the job offered. Salary: \$75,000/year; 8:30 am to 5:15 pm, M-F. Send resume to: Elizabeth Haney, Assistant VP, MYND, One MYND Center (Int. of I-77 & US 21N), Blythewood, SC 29016, Attn: Job JW.

Computer Consultant: Consult with client companies to determine needs. Design, develop, adapt, install, configure & debug stand alone & networked computer systems (hardware &/or software) as per needs of clients. Systems may incorporate Remote Access Servers. Analyze & assist in implementation of new systems & troubleshoot any problems. Develop new system specification, flow charts, manuals & train clients' employees in use of systems. Systems use MS Windows NT &/or Novell Netware operating systems. 40 hr work week-9am-5pm. Pay:\$38,800/year. Requires Bachelor degree in Comp. Sci. & 6 months experience either in job offered or in related job of Computer Software Designer. In lieu of degree in Comp. Sci., will accept degree in EE, Math or Physics if studies include 30 hrs total Math &/or Comp. Sci. with at least 15 of the 30 hrs in Comp. Sci. Experience to include; design & debug of stand alone, networked & remote access computer systems (both hrdwr & sftwr); preparation of specs, manuals & flow charts; & training of users. Applicants must show proof of legal authority to work in the U.S. NO CALLS-SEND 2 COPIES OF BOTH RESUME & COVER LETTER to Brenda Kelly, Illinois Department of Employment Security, 401 S. State St., 7 North, Chicago, IL 60605. Reference #V-IL 23453. AN EMPLOYER PAID AD.

Technical Questionnaire Analysts (Programmer/Analysts), 40 hrs/wk, hrs 8:30-5:30, sal \$37,500/yr. Duties include: asst w/tech. design; implement questionnaires; prepare, lead tech review of questionnaires; devlp, implement tech questionnaire spec, using authoring tools and program langs such as Surveycraft Authorizing Language, Survey Management System (SMS) specification language, Scytab, ScyEntry, ScyPhone, Windows, DQS, PC-based systems such as Padox, SAS; devlp, implement, sup Computer Assisted Telephone Interviewing (CATI), Computer Assisted Personal Interviewing (CAPI) and Computer Assisted Data Entry (CADE) software; deploy questionnaires by program, test, install & load onto network servers or lap tops. Req's a BS in Comp. Sci or rel'd field & 1 yr. of exp. as a Questionnaire Devlpr. Applicants must show proof of legal authority to work in the US. Send 2 copies of both resume & cover letter to Illinois Dept. of Employ. Sec., 401 S. State St., Chicago, IL 60605, Attn: Lydia Clarke. Reference #: V-IL 23667-E An Employer Paid Ad. No calls.

Software Engineers: Conduct research & develop, test & maintain programs, which comprise a portion of a system product or future products. Exp &/or background in the following areas (not all req): relational database systems, database management systems, distributed management and recovery techniques, TCP/IP, Socket IPC, C, C++, SQL, AIX, UNIX, JAVA, object oriented programming languages, Lotus Notes, Windows (95, 98 NT) operating systems, 80x86 assembly language, Soft-Ice debugger and device drivers for Windows, data security, Internet/Intranet WEB applications, HTTP, CGI, graphical user interfaces, object-oriented analysis and design techniques, domain modeling techniques, version management, configuration management, multimedia standards (MPEG-4, H.2xx, H.3xx, G.7xx, RTP/RTSP). Req: MS in CS/Math/ME/EE/Comp Eng + 1, 2 or 3 yrs exp (or equivalent) depend on position or B.S. + 3-5 yrs exp depend on position in Austin, TX, San Jose, CA, Hawthorne or Yorktown Heights, NY, Endicott, NY. Competitive salary. Please send resume w/clipping of ad to: IBM Corporation, Technical Recruiting, Job Code CW09A00, P.O. Box 218, Yorktown Heights, NY 10598. An equal opportunity employer

SENIOR PROGRAMMER/ANALYST to analyze, design, develop, test, document and implement application software systems using RPG/IV, RPG/400, CL/400, SQL/400, RLU, SDA, DBU, DFU, SEU. Client Access and Query/400 on AS/400 platform. Require: B.S. degree in Computer Science, an Engineering discipline, or a closely related field with five years of experience in the job offered or as a Programmer/Analyst. Salary: \$65,000 per year, 8:30 am to 5:30 pm, M-F. Send resume to: Colleen Murphy, Human Resources Manager, Essex Plastics, Inc., 1531 N.W. 12th Avenue, Pompano Beach, FL 33069. Attn: Job VS.

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DIRECTOR, SYSTEMS INTEGRATION GROUP. Position holder will hire, manage and supervise a group of employees to sell, integrate, and support Software Construction Company (SCC) products in various applications within the newspaper and publishing industries, as well as other industries. (S)he will give product demonstrations and make presentations to prospective customers for the newspaper and publishing industries, will build reseller and VAR relationships with third party hardware and software vendors to create total system solutions for customers and to promote the sale of SCC Products, will work with the SCC software developers to improve and enhance the product line, must have experience with and understand the latest computerized archiving and pre-press technology as it is used at newspapers and publishing organizations, must have knowledge of computer file formats used in the publishing workflow, must have knowledge of the major archiving and pre-press products available from other companies that are used in the publishing workflow, and must have excellent skills in the use of Mac and Windows computers with particular emphasis on software used in the publishing workflow, such as page layout software, photo manipulations and enhancement software, news feed processing software, wire service photo retrieval and processing software, storage management software, CDRQM Jukebox software, and photo, page, and text archiving systems. Bachelor of Science in Computer Science, or equivalent, and 8 years experience in integrating and configuring computer-oriented systems for use by graphic artists and other photo publishing professionals. \$90,000/year. Must be able to travel countrywide and worldwide. Qualified applicants submit resume to Rick Marucci, C.E.O., The Software Construction Company, 4350 Georgetown Sq, Ste 717, Atlanta, GA 30338.

Software Design Engineer: Designs, develops, implements, analyzes and documents software tools and applications used in the company's proprietary line of medical diagnostic equipment such as Magnetic Resonance (MR) Imaging. Extensively uses the C programming language and object oriented programming languages like C++ and Java to develop software applications. Develops software for the Unix environment and windows based applications. Writes shell scripts required for tools used in system installation and configuration. Uses various statistical and mathematical tools to implement Six Sigma in all projects. Maintains and supports existing code and resolves software problems that occur at customer sites for currently installed systems. Required is a Master of Science degree in Computer Science or Electrical Engineering. As part of the required education or any relevant experience, the applicant must have had training or experience in object-oriented programming in C++ and Java; had training or experience in the Unix operating system; and had training or experience with Unix shell scripts. Monday through Friday; 8:30 am to 5:30 pm; 40 hours per week; \$60,347.04 annually. Qualified applicants may submit two (2) copies of resume and cover letter to: Char Phoulavan, File #C101631; DWE-ALC; PQ Box 7972; Madison, Wisconsin 53707-7972. Reference File #C101631.

Software Engineer: Responsible for concept development, design, implementation, test and engineering documentation of advanced application infrastructure technologies and core platform software applications and services for global manufacture of medical diagnostic imaging equipment and service center. Works on cross-functional engineering teams to design and develop software for modalities such as computed tomography (CT), magnetic resonance (MR), X-rays, ultrasound, and/or other types of medical diagnostic equipment and service. Interfaces with other subsystems as well as modalities to provide technical support. Utilizes and incorporates Six Sigma methodology into every process whenever possible. Required is a Master of Science degree in Computer Science, Computer Engineering, or technical equivalent such as Mathematics, Statistics and Computer Science and one (1) year of experience in the position being offered (i.e., Software Engineer) or one (1) year of experience as an Engineer or Programmer. As part of the required experience in the position being offered or in the related occupation, the applicant must have had experience in C, C++, and Java; had experience in object oriented design; had experience in application development; and had experience in Unix and Windows. Monday through Friday; 8:00 am to 5:00 pm; 40 hours per week; \$60,347.04 annually. Qualified applicants may submit two (2) copies of resume and cover letter to: Char Phoulavan, File #C101630; DWE-ALC; PQ Box 7972; Madison, Wisconsin 53707-7972. Reference File #C101630.

Computer Programmer/Analyst needed for leading telecommunications company in Greenville, South Carolina. Must be able to develop and test computer programs, applying knowledge of programming techniques and computer systems. Must consult with users to identify current operation procedures and clarify program objectives. Must be able to design computer terminal screen displays to accomplish goals of users requests. Must be able to convert project specifications into sequence of detailed knowledge of computer programming techniques and computer language. Analyzes, reviews and alters program to adapt to new requirements. Assists users to solve operating problems. Develops and orchestrates operating support and reporting systems, functional specifications and design, scheduling and milestone tracking, system enhancement implementation. Must have Masters Degree in Computer Science or BS Degree in Computer Science and 2 years of experience as a Computer Programmer/Systems Analyst. Must have knowledge of enterprise development using MS Visual Basic, MS Analyst. Must have knowledge of enterprise development using Visual Basic, MS SQL 6.5 - 7.0, OQD, DCQM, MS Windows NT 4.0 and Seagate Crystal Reports.

Hours 9:00am to 5:00pm, Monday through Friday, 40 hours per week. \$65,000 per annum. Submit two resumes to: Ms. Regina D. Ratterree, E&T Technical Services, SCESC - SC2001129, Post Office Box 1406, Columbia, SC 29202.

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Senior Programming Analyst: Senior Member of Technical Staff who will be responsible for taking a staff role in Electronic Product Development Group projects, including assisting with the research planning, designing and analysis of software projects, performing coding and development, testing, documentation, and maintenance of the system using object oriented analysis, Visual FoxPro, Microsoft SQL, design paradigm, C, C++ and Visual Basic; assuming the role of technical team leader in researching the target application requirements, including planning and designing application structure, and analyzing the pros and cons of each consideration. Develops programming solutions for assigned projects according to specifications; testing programming solutions developed by team members and self; create program annotations, technical specifications, help text, user documentation; update, maintain, and enhance products and documentation; and assist external and internal customers with regard to product functionality. Participate in managerial decision making regarding selection of the team members. Delegate project assignments to junior programmers. Work closely with the business units in determining the product design. Involved in the product's full life cycle from conceptualization, design, development/implementation, quality assurance, customer support. Must have a Master's degree in Electronics and Telecommunications Engineering or Computer Science. Six months experience required as a Senior Programming Analyst/Senior Member of Technical Staff or six months experience as an Software Test Engineer. Experience must have included software development using object oriented analysis, Visual FoxPro, Microsoft SQL and design paradigm; software development using a "full life cycle" approach (product conceptualization, design, development, and quality assurance); software programming using C, C++ and Visual Basic. 40 hours per week, 8:00 a.m. to 5:00 p.m., \$52,000.00 per year. Must have proof of legal authority to work in the United States. Send copy resume to Iowa Workforce Center, 800 Seventh Street SE, Cedar Rapids, Iowa 52406-0729. Please refer to job order number IA101114. Employer Paid Advertisement.

Senior Applications Specialist: \$75,000/yr. Hrs: 40 hours/week; 8:00 am to 5:00 pm. Analyze, design, code, test, implement, document, maintain and support existing credit and collections database systems and new projects/enhancements in an IBM 3090, MVS/ESA environment utilizing knowledge of logical and physical database design and administration tools and COBOL II, DC COBOL II, IDMS, ADS/Q, and MVS/JCL. Participate in analysis of business needs and identify system requirements. Identify, trouble shoot and resolve a broad range of production problems using EXPEDITER. Recommend changes to improve quality of the system. Design, develop and implement a defects tracking system on MS ACCESS platform, define content of defects reporting categories and develop procedure to quantify and publish results utilizing MS EXCEL. Provide 7x24 on-call systems technical support and problem resolution for end-user support on issues of database anomalies and performance. Provide applications development project teams with technical support in database design, query optimization, database management and database anomalies of plans and scheduling. Monitor and fine tune system performance, offering improvement suggestions where appropriate. Interface directly with clients, with minimal managerial supervision to understand business goals and design and implement database systems to meet expectations and needs. Develop QA environment setup for the credit and collections database system. Develop and implement disaster recovery procedures for the system and participate in the disaster recovery drill. Direct development and implementation of major enhancement projects performed by consultants, ensure that projects are completed on-time, accurately and with no production defects. We require a B.S. in Computer Science; Information Systems or Math and 2 years of experience in the job offered or 5 years' experience in the related occupation of Database Analyst or Systems Analyst. We are an equal opportunity employer. Only individuals with authorization to work permanently in the U.S. need to apply. Send resume and cover letter to: Attn: Job Order #4032492, Program Support-3rd Floor, Connecticut Department of Labor, 200 Folly Brook Boulevard, Wethersfield, CT 06109; or fax: 860-263-6028.

Software Visualization Platform Engineer: Develops and maintains a wide range of core platform (communications, process control) and test software used for image management and visualization for the company's medical imaging devices. Develops platform system code. Develops tools to support the visual rendering and display of diagnostic imaging software. Constructs software programs in such a manner that the structures can be verified and validated in accordance with the demands of statistical quality control processes used in the design and test of the Global Software Platform. Uses and develops tools, including language parsers and object design tools, to support automated design and code generation. Develops and maintains computer visualization algorithms that are tailored to diagnostic medical images. Develops tools to support the delivery of the Global Software Platforms to a wide range of computer platforms. Develops testing software to exercise the system fully and insure reliable operation. Required is a Master of Science degree in Computer Science or Electrical, Electronic or Biomedical Engineering and six (6) months of experience in the position being offered or six (6) months of related experience as an Engineer or Graduate Research Assistant. Employer will accept completion of the course requirements for the Master of Science degree. As part of the required experience in the position being offered or in the related occupation, the applicant must have had experience with structured and object oriented programming; had experience with C++ or Java language; and had experience working in an environment with a structured testing environment appropriate to the medical device industry. Monday through Friday; 9:00 am to 6:00 pm; 40 hours per week, \$60,347.04 annually. Qualified applicants may submit two (2) copies of resume and cover letter to: Mike Brooks, File #C101672; DWE-ALC; PQ Box 7972; Madison, Wisconsin 53707-7972. Reference File #C101672.

SENIOR SOFTWARE ENGINEER to design, develop, implement, test, maintain and support application software in a client/server environment using object oriented methodologies, C, C++, Java, Orbix, Rogue Wave, Oracle, Oracle Application Server (QAS), Netscape Application Server (NAS), xdb, dbx, Rational Rose, Paradigm Plus, Shell Scripts, System V IPC, TCP/IP, CMVC, Harvest, PVCS, quantify and purify on SUN Solans and Window NT platforms. Require: M.S. degree (or equivalent) in Computer Science, and Engineering discipline, or a closely related field, with three years of experience in the job offered or as a Software Engineer. A B.S. degree with five years of progressively responsible experience will be accepted in lieu of the M.S. degree and three years of experience. Extensive travel on assignment to various client sites within the U.S. is required. Salary: \$75,000 per year, 8:00 am to 5:00 pm, M-F. Apply by resume to: Roz L. Alford, Principal, ASAP Staffing LLC, 3885 Holcomb Bridge Rd., Norcross, GA 30092; Attn: Job PP.

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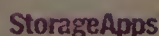
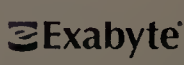
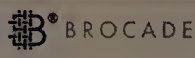
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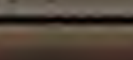
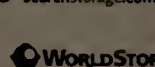
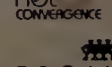
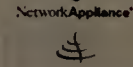
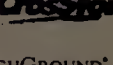
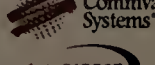
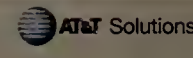
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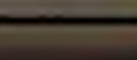
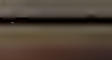
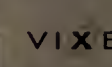
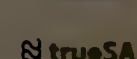
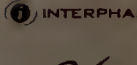
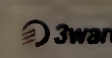
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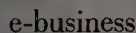
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GAINERS ↑

PERCENT

Auspex Systems	50.4
Macromedia Inc.	22.9
Network Appliance Inc. (H)	18.1
Renaissance Worldwide	17.4
Manugistics Group Inc.	14.7
Veritas Software Corp.	13.0
Adobe Systems Inc. (H)	12.5
Affiliated Computer Servs (H)	12.0

DOLLAR

Network Appliance Inc. (H)	21.13
Adobe Systems Inc. (H)	16.69
Veritas Software Corp.	15.59
Juniper Networks Inc.	15.44
Macromedia Inc.	14.06
Manugistics Group Inc.	13.50
Seagate Technology	5.63
Rational Software Corp.	5.50

LOSERS ↓

PERCENT

TenFold Corp. (L)	-36.9
Call-Net Enterprises (L)	-30.6
Winstar Communications Inc. (L)	-26.0
Cybercash Inc.	-25.5
Teradyne	-23.2
Informix Software Inc.	-20.6
Open Market Inc.	-20.5
Madge Networks	-20.3

DOLLAR

Telephone and Data Systems	-16.25
NEC	-12.50
Teradyne	-11.50
Tibco Software Inc.	-10.75
Informatica Corp.	-9.63
Viacom	-6.94
Intel Corp.	-6.88
Kla Instruments	-7.56

Strategy Shift Has Next Level in Limbo

VDSL deployment may not be as fast as hoped

BY PIMM FOX

THE FUTURE is now, but is anyone really interested in paying for it? The Phoenix rollout of Very high bit-rate Digital Subscriber Line (VDSL) was supposed to boost not only the speed of users' Internet connections but also the fortunes of Rohnert Park, Calif.-based Next Level Communications Inc. [Nasdaq:NXTV].

Next Level — originally part of General Instrument Corp., which was acquired by Motorola Inc. [NYSE:MOT] in January — started down the VDSL road with a major contract from US West Inc. But US West has been absorbed by Denver-based Qwest Communications International Inc. [NYSE:Q], and there is

some concern that the company will focus more on the business Internet user, slowing VDSL growth.

"Following successful market acceptance testing, Qwest now finds itself in the second phase of its VDSL deployment plan," says Steven D. Levy, an analyst at New York-based Lehman Brothers Holdings Inc. "This phase requires that Next Level's VDSL system meet a high return-on-invested-capital hurdle rate." But until the second phase is completed at US West, Next Level's largest customer, investors are taking a wait-and-see attitude.

Qwest Chairman and CEO Joe Nachio earlier this month said he plans to double the company's wireless and DSL customer base, adding that "all commitments to [VDSL] customers and partners will be satisfied."

Hardly a ringing endorsement from a company that accounted for 67% of Next Level's second-quarter revenue, though Next Level is watching this development. "Qwest/US West has not informed us of its plans for VDSL," says Peter Keeler, CEO and chairman of Next Level. "Any significant decline in revenues from US West would have a material adverse effect on our operating results."

Next Level also supplies field-proven VDSL video to a customer base that includes Verizon Communications [NYSE:VZ], Bell Canada International Inc. [Nasdaq:BCICF] and Cablevision Systems Corp. [NYSE:CVC], as well as a variety of local calling carriers. Overseas, France Telecom [NYSE:FTE] plans to start field trials with the company's system in October. And other international carriers have signed on as well. ▀

Next Level Levels Off

Monthly closing stock price:



SOURCE: YAHOO! FINANCE

52-WEEK RANGE

SOFTWARE OFF -4.0%

EXCH	52-WEEK RANGE	SEPT. 22 2 PM	WK NET CHANGE	WK PCT CHANGE
ASWX	149.12	11.00	Active Software	50.56 0.00 0.0
ADBE	159.25	47.53	Adobe Systems Inc. (H)	150.19 16.69 12.5
ARBA	183.34	29.96	Arba Inc.	157.69 2.81 1.8
AZPN	55.37	8.12	Aspen Technology Inc.	40.00 6.88 14.7
ADSK	56.06	17.00	Autodesk Inc.	25.81 3.25 11.2
AVID	25.56	8.75	Avid Technology	12.63 -0.88 6.5
BAANF	16.25	1.12	Baan Co. N.V.	2.41 0.16 6.9
8MCS	86.62	16.12	8MC Software Inc.	20.06 -0.08 -0.3
8D8J	150.87	21.18	Business Objects S.A.	103.00 -3.88 -3.6
CDN	27.62	12.81	Cadence Design Systems (H)	24.69 2.56 9.4
CHKP	163.37	19.31	Checkpoint Software Tech. (H)	149.13 4.19 2.7
CTXS	122.31	14.25	Citrix Systems Inc.	18.38 3.75 16.9
COGN	46.50	9.68	Cognos Inc.	40.38 1.38 3.3
CA	79.43	23.68	Computer Associates Int'l Inc.	26.00 1.88 6.7
CPWR	40.00	7.50	Computerware Corp.	8.66 1.59 15.5
DCIM	106.00	14.62	Documentum	59.13 -0.25 -0.4
EFII	69.31	21.06	Electronics For Imaging	25.06 1.38 5.2
HNCS	130.00	34.62	Hnc Software	67.94 4.25 6.7
HYSI	65.00	15.31	Hyperion Software	26.88 1.63 5.7
IDXC	49.12	10.37	IDX Systems	16.75 -0.25 -1.5
INFA	110.87	22.50	Informatica Corp.	93.38 9.63 9.3
IFMX	21.25	3.88	Informix Software Inc.	4.28 1.13 20.8
INTU	90.00	22.68	Intuit	53.75 2.25 4.0
JKHY	54.50	16.12	Jack Henry Associates	43.13 3.38 7.3
JOEC	48.31	10.25	J.O. Edwards & Co.	23.38 2.94 11.2
LGTOE	82.50	8.12	Legato Systems Inc.	11.94 1.63 12.0
MACR	120.87	39.06	Macromedia Inc.	75.50 14.06 22.9
MANU	105.50	9.06	Manugistics Group Inc.	105.50 13.50 14.7
MENT	23.87	7.75	Mentor Graphics (H)	23.19 1.19 5.4
MSFT	119.93	60.37	Microsoft Corp.	62.38 1.63 2.5
NETA	37.18	16.25	Network Associates	21.75 1.63 7.0
GMH	46.56	16.25	Network General	35.44 0.13 0.4
NOVL	44.56	7.87	Novell Inc.	9.47 -0.59 -5.9
DRCL	92.93	18.28	Dracle Corp.	78.50 2.00 2.5
PMTC	35.93	7.37	Parametric Technology Corp.	11.38 1.19 9.5
PSFT	37.87	12.00	PeopleSoft Inc.	27.31 6.06 18.2
PIXR	50.37	31.31	Pixar	32.38 0.63 1.9
RATL	64.75	13.56	Rational Software Corp.	63.38 5.50 9.5
RHAT	151.31	15.00	Red Hat Inc.	19.00 2.44 11.4
DSFT	98.12	18.00	Dquest Software	61.50 5.50 9.8
SAP	85.93	32.50	SAP AG	57.13 1.56 2.7
SCUR	29.62	2.50	Secure Computing Corp.	22.31 4.00 15.2
SORC	19.00	8.81	Structural Dynamics Research	16.13 -0.25 -1.5
SY85	31.00	10.18	Sybase Inc.	23.69 1.56 6.2
SYMC	81.62	30.43	Symantec Corp.	41.06 6.31 13.3
SNPS	75.62	25.93	Synopsis	35.94 1.38 3.7
SCTC	28.37	10.00	Systems & Computer Technology	17.00 1.31 7.2
TIBX	147.00	8.87	Tibco Software Inc.	74.56 10.75 12.6
TSAI	48.12	11.37	Transaction Sys. Architects	15.00 1.31 8.0
VRTS	174.00	25.83	Veritas Software Corp.	135.94 15.59 13.0
WINO	66.12	15.56	Wind River Systems Inc.	45.25 2.50 5.2

TELECOMMUNICATIONS CARRIERS OFF -7.8%

EXCH	52-WEEK RANGE	SEPT. 22 2 PM	WK NET CHANGE	WK PCT CHANGE
AT	91.81	47.75	Alltel Corp.	49.69 1.19 2.3
ANDW	42.06	11.18	Andrew Corp.	26.50 6.13 18.8
T	7488.00	29.00	AT&T (L)	29.00 3.38 10.4
BCE	137.50	21.00	BCE Inc.	22.75 1.25 5.2
BLS	53.50	34.93	Bell South	37.31 0.63 1.6
BRW	41.08	16.31	Cincinnati Bell Inc.	24.00 1.81 7.0
CMCSK	57.68	27.87	Comcast	35.19 1.81 4.9
COX	58.37	32.31	Cox Communications Inc. (L)	32.56 1.06 3.2
GSTRF	53.75	5.81	Globalstar Telecom. Ltd.	9.31 2.00 17.7
NXTL	82.93	27.75	NexTel Communications	46.19 5.69 11.0
POT	74.25	28.25	Panamsat	32.00 0.56 1.8
QCOM	200.00	38.07	Qualcomm	69.81 3.81 5.8
SBC	55.50	34.81	SBC Communications	47.56 3.00 6.7
FOH	75.33	24.75	Sprint Corp. (L)	24.81 3.44 12.2
TOS	137.00	69.62	Telephone and Data Systems	106.31 16.25 13.3
VIA	76.06	40.31	Viacom	56.75 8.94 13.6
WCIH	66.50	15.37	Winstar Communications Inc. (L)	15.81 5.56 26.0
WCDM	61.33	26.31	Worldcom Inc. (L)	28.88 2.31 7.9

SERVICES OFF -3.5%

EXCH	52-WEEK RANGE	SEPT. 22 2 PM	WK NET CHANGE	WK PCT CHANGE
ACXM	35.93	14.56	Axiom Corp.	30.50 1.38 4.7
ACS	50.00	31.00	Affiliated Computer Servs (H)	49.44 5.31 12.0
AMSY	44.37	14.00	American Mgt. Systems	18.00 0.06 0.3
AUG	64.43	39.06	Automatic Data Processing	62.38 1.63 2.5
BSYS	79.50	41.37	Bsys Group Inc.	79.50 4.50 6.0
CATP	27.00	5.31	Cambridge Technology Ptnrs	5.31 0.69 11.5
CEN	29.12	14.75	Ceridian	26.19 1.44 5.2
CBR	29.81	8.62	Ciber Inc. (L)	8.63 0.44 4.8
COO	57.25	17.43	Comdisco	20.38 4.00 16.4
CHRS	27.12	7.75	Computer Horizons Corp. (L)	8.50 0.13 1.4
CSC	99.87	57.93	Computer Sciences	73.19 6.25 7.9
OST	109.94	51.18	Ost Systems Inc. (H)	109.94 5.13 4.9
EDS	76.68	38.37	Electronic Data Systems	43.75 2.13 4.6
FDC	57.68	37.37	First Data Group	40.56 1.25 3.0
FISV	60.19	24.12	Fiserv (H)	60.19 4.38 7.8
IT	22.31	9.56	Gartner Group	12.88 1.38 9.6
KEA	35.00	15.87	Keane (L)	15.88 1.81 10.2
NOC	43.00	20.75	National Data	31.13 1.06 3.5
PAYX	47.62	18.41	Paychex Inc.	46.19 1.81 4.1
PER	27.93	8.87	Perot Systems Corp.	10.75 0.56 5.5
REGI	9.75	1.25	Renaissance Worldwide	1.69 0.25 17.4
REY	33.00	15.93	Reynolds & Reynolds	18.13 0.13 0.7
SFE	99.00	21.16	Safegard Scientifics	22.88 4.63 16.8
SAPE	75.59	18.15	Sapient Corp.	40.56 4.81 10.6
SOS	43.06	16.87	Sungard Data Systems (H)	43.06 2.31 5.7
SYNT	20.93	7.87	Syntel Inc.	8.78 2.09 19.3
TECO	55.87	18.00	Tech Data	43.47 4.59 9.6
TENF	76.87	4.06	TenFold Corp. (L)	4.06 2.38 36.9
TSS	20.82	14.12	Total System Services Inc.	17.13 0.44 2.6
TSAI	48.12	11.37	Transaction Sys. Architects	15.00 1.31 8.0

NETWORK OFF -8.8%

EXCH	52-WEEK RANGE	SEPT. 22 2 PM	WK NET CHANGE	WK PCT CHANGE
COMS	119.75	12.50	3Com Corp.	14.25 2.25 13.6
AOCT	49.00	9.32	AOC Telecommunications Inc.	32.00 3.13 8.9
ANIC	61.25	20.43	Antec (L)	23.38 3.19 12.0
CS	52.75	14.12	Cabletron Systems	31.81 0.81 2.5
CNEBF	6.43	1.06	Call-Net Enterprises (L)	1.06 0.47 30.6
CSCD	82.00	32.53	Cisco Systems Inc.	59.50 0.94 1.6
ECIL	39.87	23.75	ECI Telecom	30.25 1.25 4.0
ENTU	150.00	18.31	Entrust Technologies Inc.	24.06 4.38 15.4
EPRE	40.56	6.06	ePresence Inc.	7.25 0.06 0.9
HRS	39.37	15.50	Harris Corp.	25.19 3.50 12.2
GMH	46.66	16.25	Hughes Electronics/GM	35.44 0.13 0.4
ERICY	26.31	7.43	LM Ericsson	17.00 1.25 6.8
JNPR	228.00	28.25	Juniper Networks Inc.	215.75 15.44 7.7
LU	84.18	32.00	Lucent Technologies (L)	32.06 4.75 12.9
MAOGF	17.37	1.43	Madge Networks	3.44 0.88 20.3
NCOI	9.62	0.93	Network Computing Dev (L)	1.03 0.13 10.8
NWK	14.81	7.31	Network Equipment Tech.	10.63 0.50 4.5
NOK	62.50	20.04	Nokia Corp.	41.44 2.31 5.3
NT	88.00	19.90	Northern Telecom Ltd.	65.00 6.25 8.8
PCTL	15.21	1.87	Picturetel	6.50 0.38 5.5
SFA	94.00	23.50	Scientific Atlanta	59.56 6.69 10.1

52-WEEK RANGE

SEMICONDUCTORS, CHIPS & EQUIPMENT OFF -7.9%

EXCH	52-WEEK RANGE	SEPT. 22 2 PM	WK NET CHANGE	WK PCT CHANGE
TLAB	77.25	41.81	Tellabs Inc.	49.34 5.47 10.0
VRILK	22.00	1.81	Verilink	8.81 0.94 12.1
WSTL	40.75	6.43	Westell Technology Inc.	13.81 1.58 10.2
ADPT	63.56	15.37	Adaptec Inc.	21.13 2.69 11.3
AMO	48.50	8.18	Advanced Micro Devices	24.56 2.88 10.5
ALTR	67.12	20.43	Altera	51.16 1.66 3.1
AOI	103.00	23.31	Analog Devices	87.25 3.38 3.7
AMAT	115.00	35.62	Applied Materials	67.63 5.50 7.5
ASML	50.25	20.46	ASML Lithography Holding	32.13 2.88 8.2
FCS	49.50	19.50	Fairchild Semiconductor Corp.	30.88 2.75 8.2
HRS	39.37	15.50	Harris Corp.	25.19 3.50 12.2
INTC	75.81	32.50	Intel Corp.	48.81 8.88 15.4
KLAC	97.75	31.43	Kla Instruments	42.38 7.56 15.1
LLTC	74.75	27.62	Linear Technology	62.56 1.38 2.2
LSI	90.37	21.56	LSI Logic	32.31 1.31 3.9
MXIM	90.12	30.93	Maxim Integrated Products	76.25 1.75 2.2
MU	97.50	29.12	Micron Technology	51.44 7.31 12.4
MOT	61.54	27.33	Motorola	30.69 4.38 12.5
NSM	85.93	23.50	National Semiconductor	39.94 4.50 10.1
STM	73.87	21.27	SGS-Thomson Microelectronics	51.81 2.38 4.2
SLR	49.81	28.25	Soletron Corp.	45.00 2.63 5.5
TER	115.43	26.93	Teradyne	38.00 11.50 12.2
TXN	99.78	37.87	Texas Instruments	54.50 4.56 7.7
JOSU	153.42	26.31	Uniphase	104.63 0.13 0.1
VTSS	115.68	33.84	Vitesse Semiconductor Corp.	83.00 0.38 0.4
XLNX	98.31	30.50	Xilinx	81.44 0.25 0.3

COMPUTER SYSTEMS OFF -3.1%

EXCH	52-WEEK RANGE	SEPT. 22 2 PM	WK NET CHANGE	WK PCT CHANGE
AAPL	75.18	28.71	Apple Computer Inc.	51.94 -4.38 -7.8
ASPX	19.00	3.87	Auspex Systems	12.13 4.06 50.4
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CPQ	34.87	18.25	Compaq	29.00 -1.50 -4.9
DELL	59.68	33.93	Dell Computer Corp. (L)	34.69 -1.44 -4.0
GTW	84.00	41.62	Gateway 2000 Inc.	55.20 -4.27 -7.2
HEW	155.50	67.00	Hewlett Packard Co.	102.06 -2.44 -2.3
HIT	164.50	95.00	Hitachi Ltd.	117.75 -3.19 -2.6
IBM	137.68	89.00	IBM	121.88 -3.75 -3.0
MUEI	20.68	8.18	Micron	11.63 -0.44 -3.6
MDT	61.54	27.33	Motorola	30.69 -4.38 -12.5
NATI	59.50	25.50	National Instruments Corp.	44.75 -1.00 -2.2
NCR	47.00	26.68	NCR	37.06 -0.44 -1.2
NIPNY	162.00	79.37	NEC	119.00 -12.50 -9.5
PRGM	13.75	6.62	Procom Tech Inc.	29.25 -5.38 -15.5
SGI	89.50	3.06	Silicon Graphics Inc.	3.88 -0.19 -4.6
SNE	157.37	63.96	Sony	111.25 4.88 4.6
SUNW	129.31	38.93	Sun Microsystems	115.31 1.06 0.9
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Microsoft

son, senior vice president of information services at The Talbots Inc. in Hingham, Mass.

Talbots uses three platforms: mainframes for its high-end systems, Unix for its Oracle Corp. databases and PeopleSoft Inc. human resource applications, and Windows for its desktops, e-commerce site and PC-based customer service system. Bucking slow adoption trends, the specialty retailer has even accelerated its Windows 2000 Server rollout so it can run new Web product development management applications and gain the benefits of the better-performing SQL Server 2000.

But when it comes to the new high-end Datacenter version of Windows 2000, Richardson said he can't envision replacing Unix systems or running the company's planned financial applications on anything but Unix.

"They're trying to make me go from three platforms to two. Perhaps at some point, two

[platforms] would be less complex than three, so I think directionally they're correct," Richardson said. "But until [Windows 2000] is in a state that it has the reliability that I now expect out of the Unix environment, I'm just not going to be really open to making a full-blown commitment."

Christopher Smith, CIO at HomeLife Furniture Corp. in Hoffman Estates, Ill., went live with Windows 2000 in December and said he has encountered no problems with the Server, Advanced Server and Professional versions. But Smith said he doesn't need Windows 2000 Datacenter right now, since his company uses a Data General Corp. Non-Uniform Memory Access box that can scale to 128 processors for its largest applications.

Laura DiDio, an analyst at Giga Information Group Inc. in Cambridge, Mass., predicted that "it's going to be a slow, hard sell" for Microsoft as it tries to "hit Unix where it lives. Microsoft is going to have to

overcome the natural circumspection and aversion to change that these established Unix shops are going to feel and the natural cynicism about anything that says 'Microsoft' and 'high-end,'" she said.

No Delusions

Microsoft group manager Barry Goffe said his company "has no delusions of grandeur" that Unix customers will rip out their boxes.

"Most customers taking advantage of the .Net servers will be using them for new solutions," Goffe said, claiming that Microsoft has "seen the most excitement from customers building e-commerce applications." Microsoft has also gained "an enormous

amount of experience through our enterprise partners" running applications like enterprise resource planning and customer relationship management, he said.

One interesting piece of tomorrow's puzzle will be the electronic-business and integration story that Microsoft weaves about the .Net platform's various server packages in its. In addition to Windows 2000 Datacenter Server, Microsoft will discuss the integration, management and Web-enabling possibilities of its SQL Server 2000, Exchange 2000, BizTalk Server 2000, Commerce Server 2000, Application Center 2000, Host Integration Server 2000 and Internet Security & Acceleration

Server 2000.

Goffe said Microsoft's broad and deep technology platform will let customers get up and running more quickly, "as opposed to our competitors, who offer a hodgepodge of technology that requires massive amounts of service dollars to deliver anything that works."

"Not all of this is going to be shipping right away, but when you add all those together, those are a very important part of their story," said Tony Iams, an analyst at D. H. Brown Associates Inc. in Port Chester, N.Y. "They're trying to offer an end-to-end solution, desktop to infrastructure.

"Even competitors admit [that] with the tools, the application server technology and the integration tools, it's a strong story for Microsoft," Iams said. "The knockout blow in the past has been, 'What are you going to run it on?' That's why [it's important for Microsoft] to convince everyone that Windows 2000 gives you that strong foundation." ■

The Three Windows 2000 Server Operating Systems

Feature	WINDOWS 2000 SERVER	WINDOWS 2000 ADVANCED SERVER	WINDOWS 2000 DATACENTER SERVER *
Processor limit	4	8	32
Memory support	4GB	8GB	64GB
Load balancing	No	Yes (32 nodes max)	Yes (32 nodes max)
Server clustering	No	Yes (2 nodes max)	Yes (4 nodes max)

* Datacenter Server will be sold only by qualified hardware vendors that have been certified to license and support it.

Continued from page 1

Ford

in a matter of hours. The proprietors: the company's five-person quick-response executive IT support team.

According to James Yost, Ford's CIO, that team provided senior-level managers with what he described as "instant cyber-based capability" to manage the recall and replacement of the Bridgestone/Firestone Inc. tires the company believes lie at the heart of the rollover problem that has been implicated in more than 100 deaths in the U.S. alone.

The executive IT support team "scrambled" to set up that war room last month, with laptop computers plugged into the Ford worldwide network, Yost said. Since then, the team — which Yost said he considers "on duty 24 by seven" for the duration of the crisis — has

tapped numerous resources of the information technology department, including massive data centers designed to support the company's engineering and credit departments.

A key task was importing tire warranty data from Firestone to help Ford assess the role the tires played in the rollovers. Since Ford "historically never kept such data," Yost said, Firestone had to transfer it in a variety of ways, including everything from mainframe tapes to electronic file transfer to paper records, "which have been keyed in," said Yost in an interview with *Computerworld* in Austin, Texas, at the annual Dell Computer Co. Direct Connect user conference.

Firestone didn't respond to requests for comment.

Yost said the tire warranty database was key to unraveling the rollover mystery, which the company has repeatedly said in public statements relates to

problems with particular models of tires Firestone produced for the Explorer. That raw data, Yost explained, helped the company zero in on what Yost called a "subset" of information related to the Explorer tires. The executive IT support team, he said, can create such a massive database in a day.

While the executive IT support team has hands-on capabilities, Yost said, its real contribution to helping manage the rollover crisis has been its ability to tap into company-wide IT resources. "If they don't have the capability, they can bring it in," he said. These resources include the company's large IT integration center, which is normally used to "stress, test and crash" systems but is now harnessed to help the senior IT staff support the rollover war room.

Steve Wilson, president of The Wilson Group, a crisis management consulting firm in Columbus, Ohio, said most

large companies today have facilities available where they can organize for major crises and set up direct access to the information they need to manage the situation. However, getting caught off guard when technology is available to avoid such a crisis raises questions about Ford's system and how it was used, Wilson said.

"I don't think a company today should get caught off guard," said Wilson. In the case of the Ford and Firestone tire crisis, the data should have been funneled into a central repository, Wilson said. "The question is whether they didn't have that capability, didn't use it or didn't interpret the data correctly. The technology is there so that this type of thing should not have gone undetected."

Michael Schiff, director of data warehousing strategies at Sterling, Va.-based Current Analysis, said neither company should have been surprised by the crisis. "They should have

been able to find out the commonalities concerning the defective tires and gotten a jump on this," said Schiff.

Schiff also said Ford and Firestone could have handled the customer relationship management aspect of the crisis, such as getting the information on the recall out to their distributors and direct consumers, much more efficiently. "They should be able to have immediately responded," he said. "The real question was, Did they have the incentive to do that?"

In addition, Joseph Marino, an Internet commerce analyst at Current Analysis, said there could have been serious problems with the information reporting chain. "The information is there, but it has to be reported," he said. "We don't know how many incidents were ever reported to the company or the National Highway Transportation Safety Administration," said Marino. "We just don't know." ■



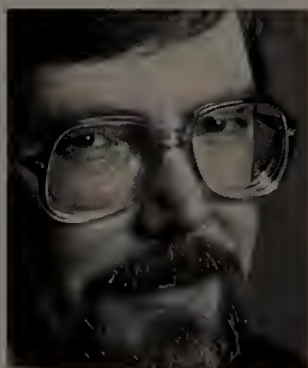
FRANK HAYES/FRANKLY SPEAKING

Conventional IT wisdom

A FEW THINGS IN IT REMAIN TRUE, DESPITE THE BEST efforts of vendor marketers, management gurus, industry analysts and *Computerworld* pundits to make everyone believe otherwise:

- The Internet poses security risks. Always has. Always will.
- Users don't understand IT — never have, never will. All they really understand is their jobs.
- No project gets enough time, budget and resources to be done the way it should be done.
- "Free" anything . . . isn't.
- Faster hardware is cheaper than faster software.
- Vendors and consultants are trying to make as much money from customers as possible. It's up to us to get our money's worth. Caveat emptor.
- The best technology doesn't always make a successful product. Then again, the best technology may not be what you need.
- Some vendors *really* don't like some other vendors — so much that they're willing to let it get in the way of working with customers.
- If nobody else is trying something, there's usually a reason. Maybe not a good reason, but a reason.
- Faster hardware doesn't solve business problems — unless the business problem is slow hardware.
- The CEO will always think consultants' ideas are good because he's paying good money for them.
- Traffic expands to fill the bandwidth provided.
- If you take something away from users, they'll sneak it in the back way anyhow.
- The most powerful influence on CEOs' IT preferences are the people who write for airline in-flight magazines.
- "More bandwidth/memory/storage/processing power than you'll ever need" will last you six months. A year, tops.
- "We've never done it that way before" is a more powerful argument than any cost/benefit analysis.
- IT projects advance or die. Sometimes both.

IT projects
advance
or die.
Sometimes
both.



- Nobody ever got fired for buying the flavor of the month.
- What counts isn't how much a product costs when you buy it. What counts is how much it costs before you finally shut it down.
- Functionality isn't the same as usefulness.
- When you just have a hammer, everything looks like a nail. Most IT people just have technology.
- It always takes longer and costs more to fix it later.
- The systems that last are the ones you were counting on to be obsolete.
- A good idea is no match for a bad habit.
- By the time your CEO has read about a technology, it's no longer a strategic advantage.
- Ninety percent of a system's cost is still training people to use it.
- IT projects fail. Large projects fail more often than small ones. So if failure isn't an option, you'll never do anything.
- If you think your company's users are awful, just wait till you're on the Web and have customers of your own.
- Exactly what you want always costs more than what you can afford — whether it's technology or IT employees.
- Old ideas got that way because they proved useful.
- Data isn't information. Information isn't knowledge. Knowledge isn't manageable.
- Systems aren't made from metaphors, paradigms and methodologies. They're made from code, wires and hardware.
- The Model T didn't become a standard because it was the best. It became a standard because it was the cheapest.
- The hardest problems get solved last. ▀

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SHARK TANK

THE GOOD: Non-IT pilot fish with a corporate support contract calls a PC vendor after a hard-drive crash. Tech support offers to talk her through replacing it over the phone. Why not, the fish figures, if it'll save every one time and money? But after two weeks, three drives from the vendor and checks of every cable and setting, the PC still won't boot. Finally, a senior support rep takes the case, and thinks to ask a critical question: "Did anyone tell you that the drives are shipped unformatted, without partitions and with no operating system?"

THE BAD: Non-IT manager insists she should have input into IT buying decisions because of her "extensive technical background," reports a pilot fish. The manager proceeds to write up requisitions for modems and printer switch boxes for workstations and printers that are about to be installed on the network, then asks a consultant brought in for an informational meeting, "What exactly is the difference between Windows 3.1, Windows 95 and Windows NT?"

THE UGLY: Administrative manager at a manufacturing compa-

ny has hard-disk problems, and no wonder — he hangs notes on the side of his computer case with magnets. "We told him to get rid of the magnets," says an IT pilot fish, but they keep showing up — and so do disk problems. "We solved the problem by changing his case to a tomato-red plastic job," says the fish. "We told him it was to color-coordinate his PC to his red rug."


EXECUTIVE ASSISTANT pilot fish is the de facto IT go-to-gal for her department, where some new employees have never touched a PC. One such new hire looks more promising than most: "She took really good notes and I thought, OK, this one might be all right," says the fish. Until the new hire comes to the fish in a panic — she's lost her notes and can't figure out how to log on to Windows NT. Groans the fish, "It tells you exactly what to do right there on the screen: Press Control + Alt + Delete. . . ."

Talk to the Shark: sharky@computerworld.com. You get a sharp Shark T-shirt if your tale sees print in the weekly feeding frenzy — or turns up online at computerworld.com/sharky.

The 5th Wave



"I AM pushing, but the 'enter' button seems to be stuck!"



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